SOUTHERN POWER AND INDUSTRY

JUNE, 1956

Southern Power & Industry provides information that will help solve design, installation, maintenance and operating problems of engineers and executives in manufacturing, processing, service and power plants in the South and Southwest.

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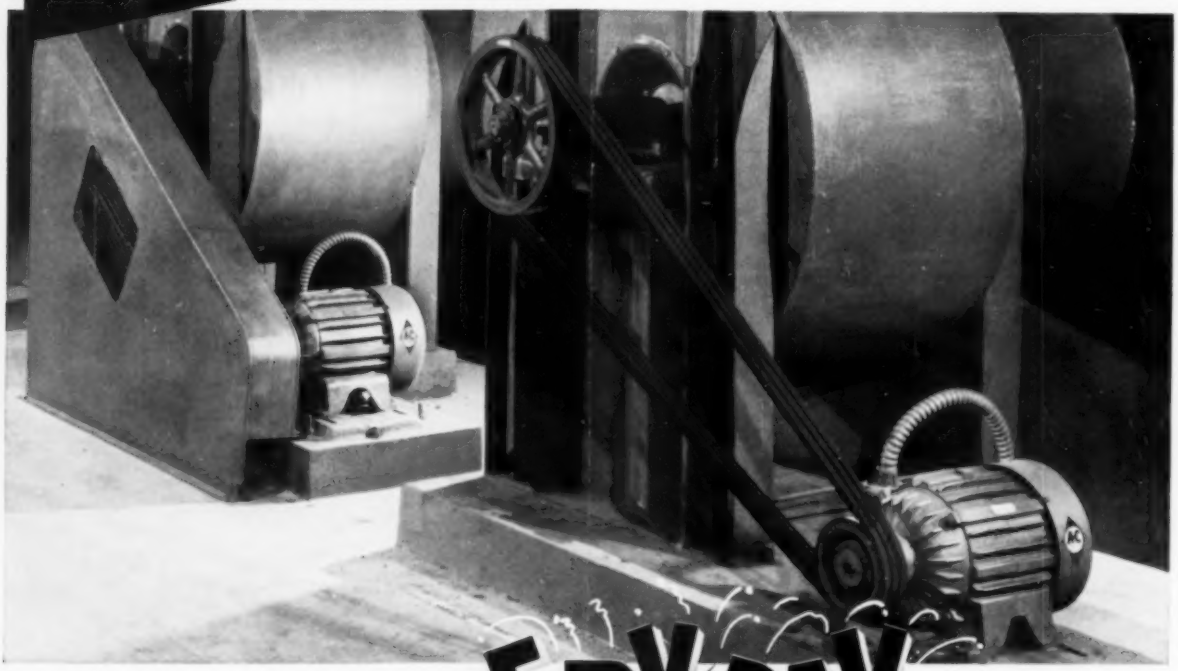

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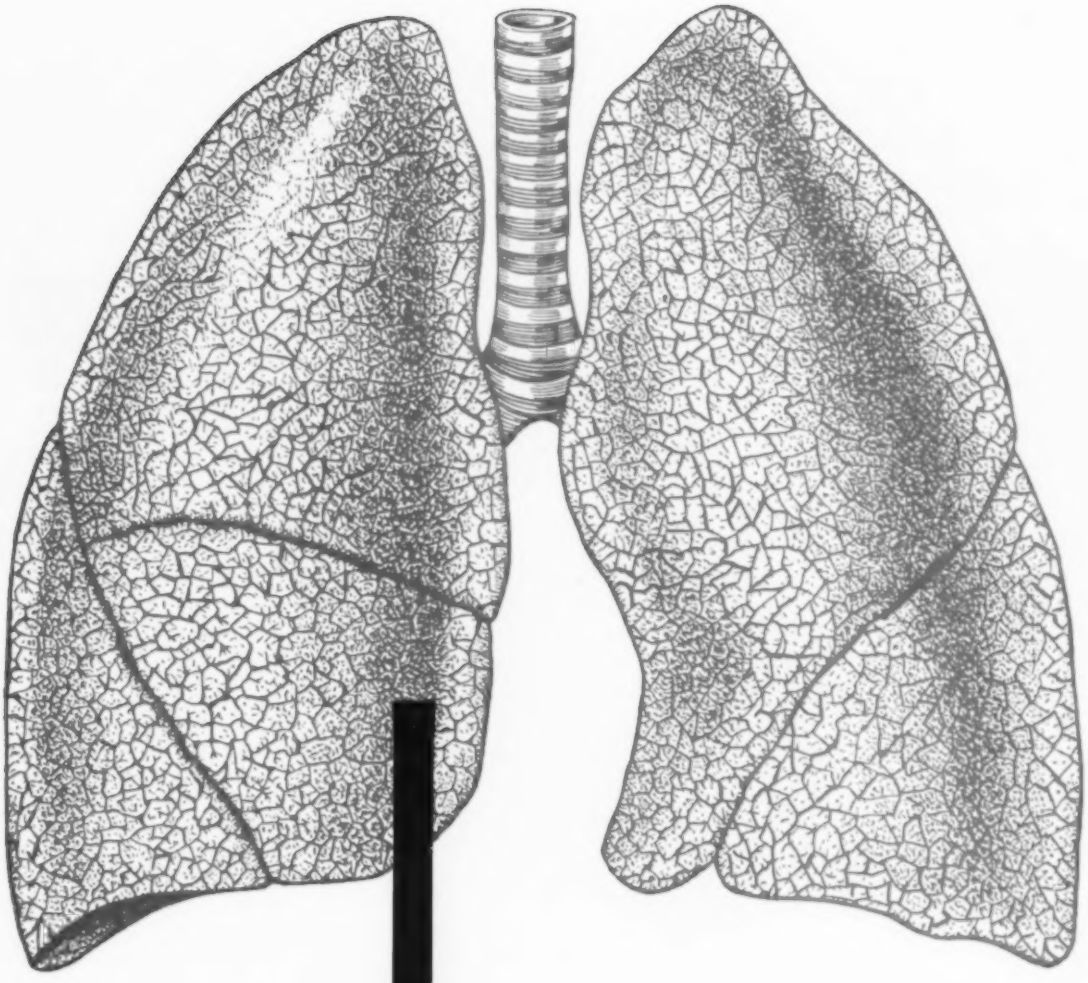
Volume 74 Number 6



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SOUTHERN POWER AND INDUSTRY

Vol. 74
No. 6

JUNE, 1956

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•

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•

BUSINESS REPRESENTATIVES

E. L. Rogers, 299 Madison Ave., New York 17, N. Y.—Phone Murray Hill 2-4959.

George Isherwood, 590 Rutherford Dr., Springfield (Del. Co.), Pa.—Phone KI 3-0760.

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Annual Subscription—$1.00
Foreign—$10.00

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Published monthly by
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Contents indexed regularly by Engineering Index, Inc.

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Editorial and Executive Offices: **SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 8, GEORGIA**

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

June 1, 1956

◆ PLANT-TESTED PROCEDURES to increase production, reduce maintenance costs, and save materials are reported monthly in SPI advertising and editorial pages. Many of the ideas, methods, suggestions, etc., are new.

But this does not mean that you can grab a new idea and immediately put it to work in your own plant. It may not fit your needs at all, or changes and adaptations may be necessary. Each problem demands individual attention, and merits of all changes should be thoroughly considered.

Don't expect the other man to do your work for you. But part of your work should be to find out what the other man is doing . . . and why. That's what SPI gives you every month—a round-up of production and maintenance activities in the South and Southwest.

◆ RUST INHIBITING TREND—VPI Crystals, a highly effective rust inhibitor used in bulk by industry, is now available to the small quantity consumer. One producer—Al-Con Chemical Company of New Orleans—is packaging the inhibitor in either 2-oz shaker bags, or 4-oz polyethylene spray bottles. It is easily applied to any metal surface which is to be kept free from corrosion.

The bagged crystals and the bottled spray powder are used to protect tools, instruments, and all types of stored or enveloped metal. The spray bottles are particularly applicable for spraying recording and controlling instruments, electrical switch gear and control panels.

◆ TUNGSTEN CARBIDE manufacturers, as well as producers of wood-cutting tools employing tungsten carbide cutting edges, have been emphasizing the production and maintenance advantages of carbide tools in the woodworking industry. Drexel Furniture Company in the Carolinas, has been thoroughly sold for some time.

Over seven years ago Drexel began using a few carbide-tipped cut-off and rip saws and has gradually expanded to a program that uses carbide on every wood-cutting machine except the band saws.

Applications and production benefits in the rough mill departments and finish machine room are particularly notable. "How Carbide Tools Cut Costs" in the Carolina Drexel plants is featured on pages 56-57, SP&I for May. A subsequent discussion, scheduled for early publication, will cover maintenance techniques and procedures.

◆ PIPE WELDING—Inert-gas tungsten-arc welding of piping without backing rings, smoother root pass welds with elimination of root pass cracking and improved weld contours in thin wall piping with one or two less passes, are some of the benefits offered by Grinnell Company's new consumable solid insert rings. They are produced for all standard or special pipe and tube sizes of diameters 1 1/2-in. or larger.

(Continued on Page 6)

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ALLEN-BRADLEY *Special* CONTROL PANEL...

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Use this A-B Handy Catalog as a quick and easy reference guide in selecting components for trouble free control panels.

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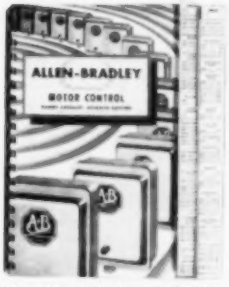

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Facts and trends *(continued from page 4)*

◆ JUST WHERE DOES THAT LINE GO? Hank says he remembers it about here and Bert says it's at least 6 ft deep and he seems to remember that it tees off close to that corner, then angles across the road and there should be a cut-off somewhere. Perhaps the black top's got it covered

In case you missed the item, read "How to Locate Underground Runs of Piping, Conduit, etc."—SP&I for May, pages 66-67. Robert Garrett, Chief Electrician, Oerlikon Tool & Arms Corporation, Asheville, N. C., reports on his "Rube-G"—a home-grown device. He says no particular effort was exerted to make the "Rube-G" pretty but it has proved itself a lifesaver on several occasion.

◆ INCINERATOR STACKS—Incinerator installations often do not warrant the cost of a brick stack, yet demand the permanence and high draft of masonry construction. Van-Packer Corporation's (Bettendorf, Iowa) pre-cast insulated stack is claimed to cost about 2/3 less than a comparable brick stack and about the same as a steel stack.

Vermiculite concrete chimney sections of the stack are not affected by corrosive gases and can withstand the sudden and frequent temperature shocks developed by incinerators. Stack is made up of 3-ft long sections cemented one on top of the other with acid-proof, high temperature joint cement. Aluminum outer jacket eliminates maintenance and painting.

◆ ADAPT OLD MOTORS TO NEW JOBS—Basically sound electric motors are often left over when changes and modernization programs are completed. Oklahoma Gas & Electric Co. find that by changing a few characteristics, such as speed or voltage, these motors may often be used to advantage.

Here are a few "before" and "after" examples—50 hp to 125 hp; 220 volt, 3 phase to 2300 volt, 3 phase; 700 rpm to 1700 rpm; Babbitt thrust for weight of motor only to ball thrust to carry motor and driven pump; and solid shaft to hollow shaft.

The rewinding was done by a commercial company. The changing of the shaft and the addition of the ball thrust and its attendant oiling system was done by plant maintenance forces in the OG&E shops.

◆ A NEEDLE can be driven through a coin if it first goes through a cork. It is the support of the pin by the cork that makes it possible. Ramset Fastening Systems' new "Shure-Set" works on the same principle.

It's a manually-powered fastening tool which seats a specially-constructed fastener into a variety of materials such as concrete, concrete block, cinder block, brick and steel. It eliminates toggle bolts, expansion shields, anchors, concrete nails and the tedious job of star drilling.

Shure-Set is recommended for 158 different light fastening uses in general industrial plants. By striking the top rod with a hammer, the fastener is seated into the surface. Base plate levels the tool at right angles to the work and a hand grip keeps the hand from sliding. Tool is used by electricians, plumbers, sheet metal workers, carpenters, maintenance men, etc.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 8, Ga.

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These photomicrographs illustrate the ability of wrought iron to receive a tighter, heavier zinc coating. Because the life of the coating is directly influenced by its adherence and weight or thickness, zinc coating on wrought iron lasts longer.

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NEWS *for the South and Southwest*

COMPANY EXECUTIVES at business meeting of **FLORIDA NUCLEAR POWER GROUP: J. W. Lastinger, President, Georgia Power & Light Co.; R. S. Stevenson, President, Allis-Chalmers Mfg. Co.; W. J. Clapp, President, Florida Power Corp.; W. T. McCullough, Vice President in Charge of Sales, Babcock & Wilcox Co.; R. H. Fite, President, Florida Power & Light Co.; W. C. MacInnes, President, Tampa Electric Co.**

Florida Nuclear Power Group

Executives of the principal electric utility companies of Florida have been for some time developing plans for joint activity in the atomic energy field. These executives, together with officials of Babcock and Wilcox Company, Allis-Chalmers Manufacturing Company and Stone and Webster Engineering Corp., have signed an agreement to cover financing and experimentation that is expected to lead to design of a 200,000 kw plant to be constructed in the vicinity of Bradenton, Florida. 1961 or 1962 is the present goal for operation of the joint facility.

Representatives of all companies in the enterprise attended the Forum on Prospects for Atomic Energy for the South in Atlanta, April 17 and 18. At that time a meeting of the Florida Group was held to discuss progress and plans. "Florida Nuclear Power Group" was selected as the official name of the organization. A decision was reached to act as a group in securing "Q" clearances for personnel working on the project.

Babcock and Wilcox Company invited the group to hold its next meeting at the Lynchburg, Virginia facility of B & W. An inspection of B & W plant will follow the meeting.

Those present at the Atlanta business meeting were: Tampa Electric Company—Earl E. Cooley; Florida Power Corporation — William J. Clapp; Florida Power & Light Company — McGregor Smith and George Kinsman; Allis-Chalmers Manufacturing Company — C. R. Braun, E. T. Cuddeback, C. W. Bloedorn, and D. S Kerr; The Babcock & Wilcox Company — Paul R. Yopp, John E. Brennan, Claude L. Huey, and John W. Landis; Stone & Webster Engineering Corp. — William F. Ryan.

Plastics Facilities—Atlanta

Meadows Manufacturing Co., 1190 Astor Ave., S.W., Atlanta, Georgia, manufacturers of textile machinery, has expanded its plastic facilities. Previously, the Plastics Division specialized in compression molding of high impact products which the company uses in the construction of its textile machinery. Now services extend to the industrial plants of the **South.**

The new field of plastics which the company has entered covers the reinforced fiberglass polyester and epoxy resins. This versatile resin (epoxy) has many applications in the tooling field, such as prototypes, Kellering models, drill jigs, vacuum molds and match plates for the foundry trade.

In addition, they have just been given the exclusive sales rights for the southern territory by Feberite Corp. of Winona, Minn. to use their recently developed, high impact, heat resistant phenolic resin reinforced with fiberglass. The material has innumerable applications in the industrial field and opens new channels for plastics applications which could not be entertained before. Its superior high heat resistance and high impact strength, with very little shrinkage, if any, permit the molding with ease of parts that require close tolerances in molds made of aluminum or brass.

The foundries have already adapted this material for core driers where both dielectric ovens and hot-air ovens are used.

To carry out this expansion program, the Meadows Manufacturing Co. secured W. T. Roose, formerly of Plastics Corp. of Chicago and Foundry Plastics Co., as the Chief Plastics Engineer of this department. Mr. Roose has been in the plastics field since 1940 and has had considerable experience in the reinforced fiberglass, compression and injection molding fields.

For the past nine months, Mr. Roose devoted practically his entire time in trying to find a suitable material for core driers that could be used in dielectric ovens. During this research period, with the assistance of technical help from the Shell Chemical Co., the material for match plates was developed, and it is now being widely used by many of the northern foundries.

More News — Page 30

USS Glacier, world's largest icebreaker, lead ship in Navy expedition "Operation Deepfreeze"

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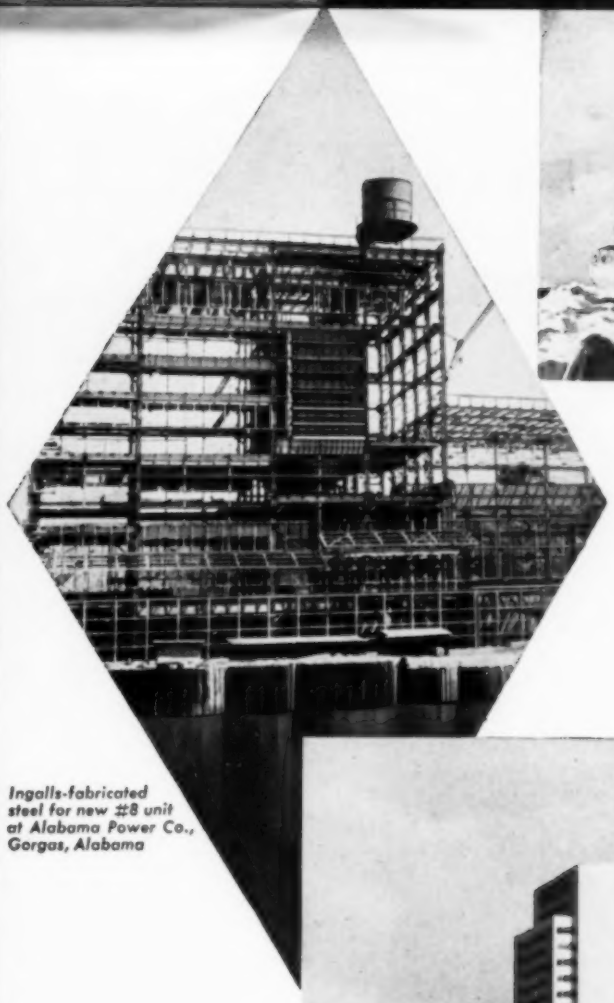
For steel fabrication . . . there is The Ingalls Iron Works Company, a major fabricator of steel throughout the country for power houses, buildings, bridges, gymnasiums, etc.



Ingalls-fabricated steel for new #8 unit at Alabama Power Co., Gorgas, Alabama

Prudential Life Insurance Company building, Jacksonville. Steel fabricated and erected by Ingalls.

Ingalls-built Birtank loaded on lowboy for easy shipment.

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For steel erection . . . there is The Ingalls Steel Construction Company, which erects structural framework for buildings, power houses, tanks, bins and stacks.

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THE INGALLS STEEL CONSTRUCTION COMPANY
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the Miracle on

On the banks of the Ohio, right now, these two huge electric plants are turning out power at the rate of over 18-billion kilowatt-hours annually. They are, respectively, the first and second largest investor-owned power plants in the world.

They stand on what was farmland less than three and one-half years ago.

Their completion, substantially ahead of schedule, is the result of the outstanding teamwork of management, investors, engineers, technicians and workers in privately-owned utilities and their suppliers.

The vast power output of these plants, *almost half as much electricity as all France produces*, is ready to assure uninterrupted operation of the Atomic Energy Commission's uranium diffusion center near Portsmouth, Ohio.

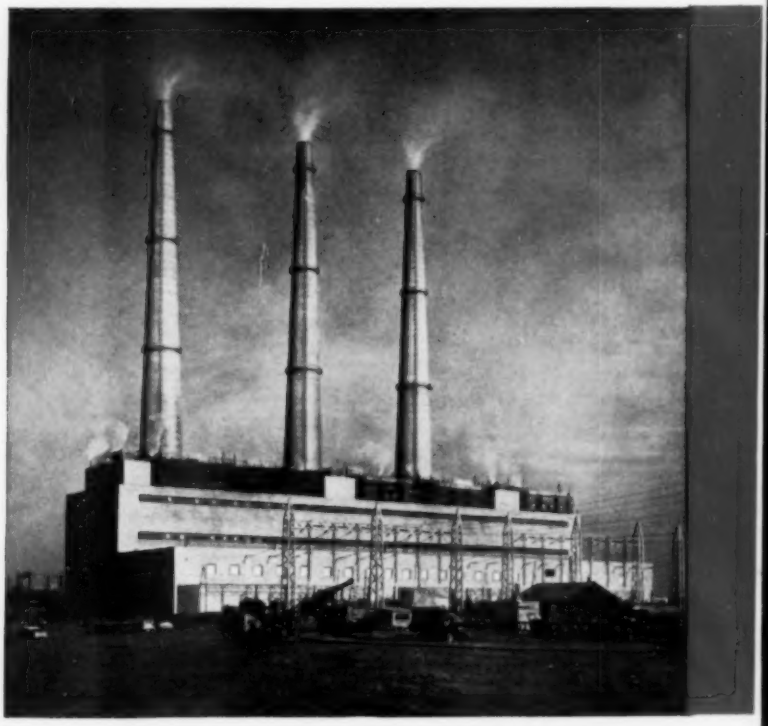
When the AEC made its enormous needs known, 15 private electric companies* joined forces to form the Ohio Valley Electric Corporation and its subsidiary, Indiana-Kentucky Electric Corporation. Pooling their resources in men, money and experience, they and their suppliers worked faster than the construction timetable. In quick order the 11 gigantic B&W boilers, the turbines, generators, buildings—and all the vast complex of auxiliary equipment—were designed, built and placed into operation.

The first generating units were placed in commercial operation in February 1955. The final unit went on the line in February 1956 at Clifty Creek, marking the largest installation of power in a single project ever made in a twelve-month period.

All Americans can be proud of OVEC-IKEC for this great accomplishment. What appears to be a miracle, in reality is, a clear demonstration of what private enterprise and enlightened government, working together, can accomplish for the benefit of the entire nation.

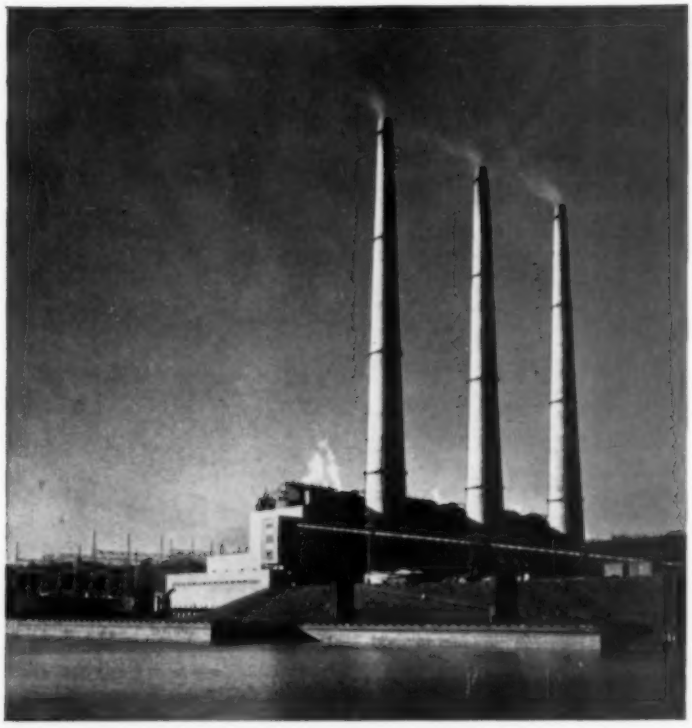
The future will undoubtedly pose many similar challenges. Can they be met? Are enough young engineers, business men, technicians, and skilled workers being developed to accept these great responsibilities? Babcock & Wilcox, like so many other American firms, is pledging its resources to guarantee that the answer will be "Yes!" Recruiting and training young men, expanding and modernizing production facilities, conducting extensive research and engineering development projects—all are part of a long range B&W program to contribute its share to the technical and economic progress so necessary for the continued growth of the nation.

The Babcock & Wilcox Company, 161 East 42nd Street, New York 17, N. Y.

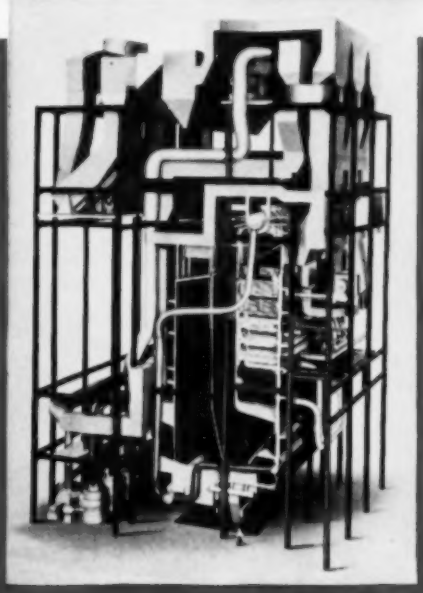


KYGER CREEK PLANT, at Cheshire, Ohio, with a capacity of 1,075,000 kilowatts, is the world's second largest investor-owned power plant.

the Ohio River



CLIFTY CREEK PLANT, at Madison, Indiana, with a capacity of 1,290,000 kilowatts, is the world's largest investor-owned power plant.



11 B&W Open-Pass Boilers generate steam for the two plants. Each boiler produces 1,330,000 lb of steam per hr at 2000 psi and 1050 F, with reheat to 1050 F. The utilization of high temperatures, high pressures and reheat at both plants places them among the most efficient and economical in operation.

***SPONSORING COMPANIES OF OVEC-IKEC**

Appalachian Electric Power Company* • The Cincinnati Gas & Electric Company • Columbus and Southern Ohio Electric Company • The Dayton Power and Light Company • Indiana & Michigan Electric Company* • Kentucky Utilities Company • Louisville Gas and Electric Company • Monongahela Power Company** • Ohio Edison Company • Ohio Power Company* Pennsylvania Power Company*** • The Potomac Edison Company** • Southern Indiana Gas and Electric Company • The Toledo Edison Company • West Penn Power Company**

* Subsidiary of American Gas and Electric Co.
** Subsidiary of The West Penn Electric Co.
*** Subsidiary of Ohio Edison Co.

G-749

BABCOCK & WILCOX

BOILER DIVISION

The Booming South and Southwest . . .

New Plants — Expansions

√ Manufacturing Plants
√ Utility Plants
√ Large Service Plants

Highlights for June, 1956

South Atlantic States

$17,000,000 **Delaware Power & Light Co.** electric generating plant underway at **Indian River, Md.**

40,800 sq ft mill work factory for **Snow Lumber Co.** being erected on a 12½ acre site at **High Point, N. C.** with July-August completion anticipated . . . Liquid alum plant underway in **Plymouth, N. C.** by **American Cyanamid Co.** with completion expected in July . . . **International Paper Co.** planning a $1,000,000, 60,000 sq ft paper carton plant in **Raleigh, N. C.** which will turn out 35,000,000 milk cartons monthly when operation is begun by the first of the year . . . **Raleigh, N. C.** is the site of the $500,000 **Coca-Cola Bottling** plant—75,000 sq ft building on 33 acres of land to turn out 480 bottles of Coke per minute.

Underway at **Dillard, Va.** is **Old Dominion Box Co.'s** first unit to its 80,000 sq ft plant, costing $500,000 . . . Summer will see the beginning of **American Tobacco Co.'s** $400,000 office building at **Richmond, Va.,** which is expected to be completed by March, 1957.

$750,000 expansion program planned for **Huntington Publishing Co.** at **Huntington, W. Va.** — includes a building addition, color press and new equipment . . . Catalytic Construction Co. erecting a $10,000,000 plastics plant on a 135 acre site in **Washington, W. Va.** for **Marbon Chemical Division of Borg-Warner Corp.**

These highlights briefed from SPI's SOUTHERN INDUSTRIAL NEWS SERVICE, a monthly publication issued exclusively to SPI advertisers and their representatives through the South and Southwest.

East South Central

Plans underway for construction of 100,000 sq ft multi-million dollar metals plant for **Malloyr-Schwarzkopf Metals Inc.** at **Huntsville, Ala.** which will produce molybdenum and other high temperature metals — to be erected during the year . . . $15,000,000 expansion planned in **Roberta, Ala.** for **Southern Cement Co.** plant to increase production of lime, cement and concrete pipe—early 1957 completion.

Mid-June completion anticipated for **Olin Mathieson Chemical & Metal Corp.'s** 100 x 80 ft plant addition at **Gulfport, Miss.,** the first step in its **Miss. Aluminum Corp.** subsidiary expansion program . . . 95% of $14,000,000 will be spent on **Masonite Corp's Laurel, Miss.** hardwood plant expansion, which will require 18-24 months to finish . . . Underway at **Meridian, Miss.** is the $3,500,000 furniture lumber processing plant for **Kroehler Mfg. Co.** which is to be completed by June, 1957 . . . Plans being laid in **Pascagoula, Miss.** for $5,000,000 high-analysis fertilizer plant for **Miss. Chemical Corp. of Yazoo City** which will provide 150,000 tons of fertilizer annually . . . **Miss. Valley Portland Cement Co.** will construct a $3,500,000 cement plant at **Vicksburg, Miss.** which will turn out 1,500 barrels daily.

Covington, Ky. anticipates fall completion of the $250,000 warehouse for **Gardner Board & Carbon Co.** . . . **Kentucky Utilities Co.** at **Lexington, Ky.** plans expenditure of $20,839,000 for the year for extensions and improvements. Includes: $9,000,000 first unit of 500,000 kw generating station; $400,000, 138,000 volt transmission line; $202,000 substation addition completion; $200,000 system network analyzer . . . Underway on a 10 acre tract in **London, Ky.** for **Kentucky Concrete Pipe Co.** is a $200,000 plant which is expected to be in operation by June . . . a 12 mile high voltage line and a new substation at **Wilder, Ky.** — a $1,635,000 project for **Union Light, Heat & Power Co.** — will be begun in the spring.

West South Central

A two year expansion program costing $40,000,000 is underway at **Baton Rouge, La.** by **Esso Standard Oil Co.** on the nation's largest refinery . . . Mid-1957 operation is scheduled for **W. R. Grace & Co.'s** $18,000,000 polyethylene plant which is being erected on a 18 acre site in **Baton Rouge, La.** . . . **Gaylord Container Corp.** is

spending $2,000,000 on new equipment for its plant at **Bogalusa, La.** . . . $12,500,000 petrochemical plant, to produce 100,000 tons of ammonia annually upon its completion in 1957, is being erected by **Petroleum Chemicals Inc.** at **Lake Charles, La.** . . . A cold storage warehouse, processing and freezing plant which will cover 6 acres on a 17 acre tract is underway in **New Orleans, La.** by **New Orleans Cold Storage and Warehouse Co., Ltd.**

Ridley Packing Co. is effecting plans for $100,000 plant addition at **Duncan, Okla.**, its fifth expansion since the company's beginning in 1941.

$3,000,000 addition to **Cosden Petroleum Corp.'s Big Spring, Tex.** refinery underway which will produce 20,000,000 lb of plastic grade styrene annually . . . **Reynolds Metals Co.** has begun its $25-$30,000,000 expansion program for its **Corpus Christi, Tex.** alumina plant — to increase production 50% . . . 14,000 sq ft manufacturing and warehouse plant will be constructed on a 50,000 sq ft tract for **Delco Chemicals, Inc. at Dallas, Tex.** . . . $45,000,000 expansion underway at **Freeport, Tex.** for **Dow Chemical Co.** with completion expected in 1958 . . . One of the three units in the $150,000 building program of **Automatic Power, Inc.** has been completed at **Houston, Tex.** . . . Assembly-line plant underway at **Houston, Tex.** for **Monorail, Inc.** with production expected by June . . . **Houston, Tex.** is anticipating September construction of the $1,000,000 steel and aluminum plant of **Vinson Steel & Aluminum Co.** . . . **Sinclair Refining Co.** effecting plans for $2,000,000 improvement of its **Houston, Tex.** waterfront facilities . . . September completion expected for **Longview, Tex.'s** $212,000 water filtration plant improvements . . . **Odessa, Tex.'s** $30,000,000 rubber plant underway for **El Paso Natural Gas Co.** . . . Multi-million dollar butadiene plant for **Firestone Tire & Rubber Co.** underway at **Orange, Tex.** — operation scheduled in 1957 with 40,000 tons annual production anticipated . . . **Texize Chemicals, Inc.** plans construction of its first chemical plant outside the Greenville, S. C. area — in **Palestine, Tex.** — to be underway by August . . . $250,000 plant underway for **Hubbard and Co.** galvanized electrical pole line hardware, on a 14 acre site in **Plano, Tex.** . . . **Metropolitan Bottling Co., Inc.** of **Waco, Tex.** is erecting a $700,000 bottling plant.

Kansas and Missouri

Coffeyville, Kan. is watching the $3,300,000 expansion project of its light plant which is expected to be completed by late spring . . . 40,000 sq ft furniture manufacturing plant underway at **Newton, Kan.** for **Fred V. Gentsch Inc.** . . . June completion anticipated for **Stevens Spring Co's** 20,000 sq ft spring manufacturing plant at **Newton, Kan.**

Plans being instigated for $100,000,000 hydro-electric plant, producing 1,200,00 kw, for **Union Electric Co.** at **Bloomsdale, Mo.** . . . $6,000,000, 24,000,000 lb/yr pentaerythritol plant for **Hercules Powder Co.** underway at **Louisiana, Mo.** with completion expected early in 1957 . . . **Ramsey Corp.'s** 100,000 sq ft industrial products plant underway at **St. Louis, Mo.** with completion scheduled for early 1957.

THOMAS W. MARTIN, Chairman of the Board of ALABAMA POWER COMPANY (left) receives a Coffin Citation from CLYDE A. LILLY, Alabama Manager of GENERAL ELECTRIC'S User Industries Sales Department. The Alabama Power Company was cited by the Edison Electric Institute for "an outstanding and successful program in rural sales development and promotion of farm electrification; for foresight and success in planning for and gaining Congressional approval of the comprehensive development of the Coosa River including power, recreation, industrial water supply, and navigation; and for extraordinary accomplishments in the field of accident prevention.

FUTURE EVENTS of Engineering Interest

June 5-8; Material Handling Institute's Exposition of 1956, Cleveland Public Auditorium, **Cleveland, Ohio.**

June 22; Public Utilities Accident Prevention Conference, Hotel Roanoke, **Roanoke, Va.;** sponsored by Accident Prevention Committee, Public Utilities Association of the Virginias; Robert W. McKinnon, Exec. Secty., 5 Franklin Rd., Roanoke, Va.

Sept. 14-15; 38th Annual Meeting, Public Utilities Association of the Virginias, Greenbrier Hotel, **White Sulphur Springs, W. Va.** Estimated attendance 400.

Sept. 23-26; Petroleum-Mechanical Engineering Conference, A.S.M.E., Conrad Hilton Hotel, **Dallas, Texas;** C. E. Davies, Secty., A.S.M.E., 29 West Thirty-Ninth St., New York 18, N. Y.

Sept. 27-29; 33rd Annual Meeting, National Management Association, Sheraton-Jefferson Hotel, **St. Louis, Mo.** National Management Assoc., 321 West First St., Dayton 2, Ohio.

Oct. 23-25; Industrial Packaging and Materials Handling Engineers Exposition and Educational Short Course, St. Louis, Mo.; SIPMHE headquarters at 20 West Jackson Blvd., Chicago 4, Ill.

Nov. 26-30; Third International Automation Exposition, Trade Show Building, 500 Eighth Ave., **New York City.**

"We found by actual tests that FUSETRON dual-element FUSES would eliminate Motor Burnouts on our Welders"

"Here are the facts . .

"In 1946 we were having trouble with single phasing and subsequent burnout of our 3-phase welders. Motor repairs and replacements, plus the down-time was very costly.

"Could this situation be corrected, we wondered, by individually protecting each welder with Fusetron fuses?

"We ran our own test to find out. On 400 ampere welders — 3 pole fuse blocks were mounted in a steel enclosure. 80 ampere, 250 volt Fusetron fuses were installed on the load side of the enclosure.

"The circuits were then single phased. On every test the Fusetron fuses opened in 21 to 23 seconds.

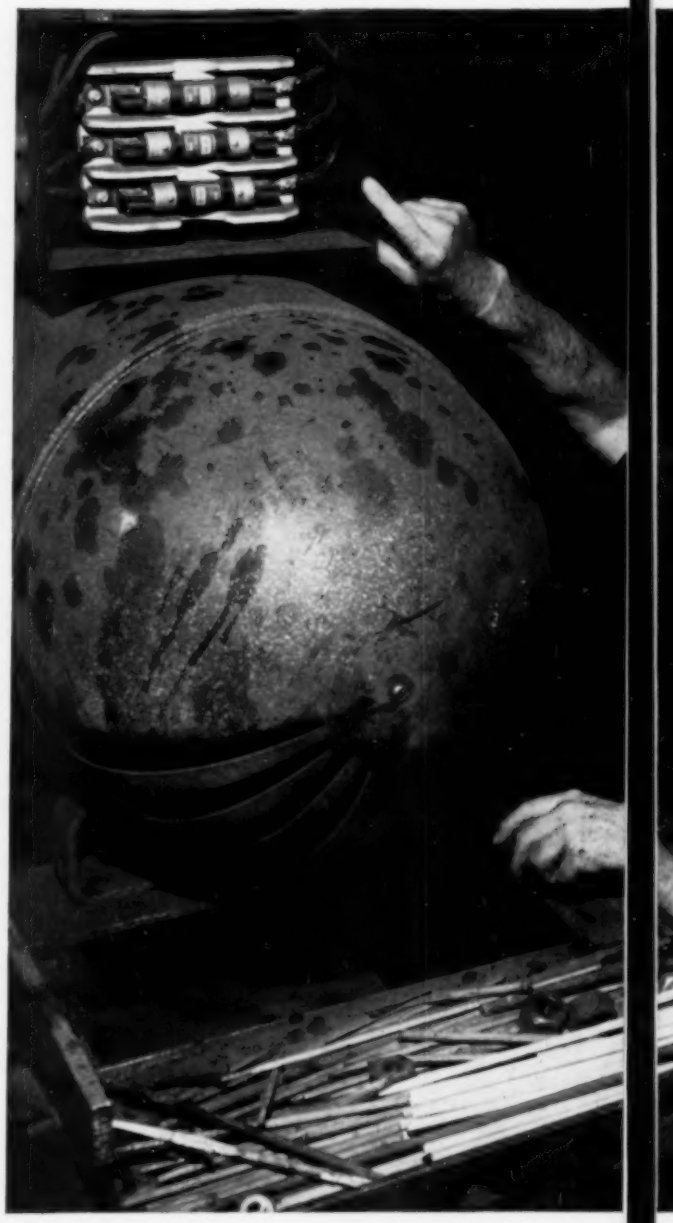
"On checking further with a hook ammeter we found the locked rotor current to be 325 amperes.

"As a result of these tests, we protected all 62 welding machines with Fusetron fuses in the proper motor protection sizes.

"Sure, since then we have blown a number of fuses — but we have not had one motor burnout due to single phasing. Fusetron fuses have certainly cut costs for us.

"Today, there are 147 welding machines in operation and each is protected with Fusetron fuses."

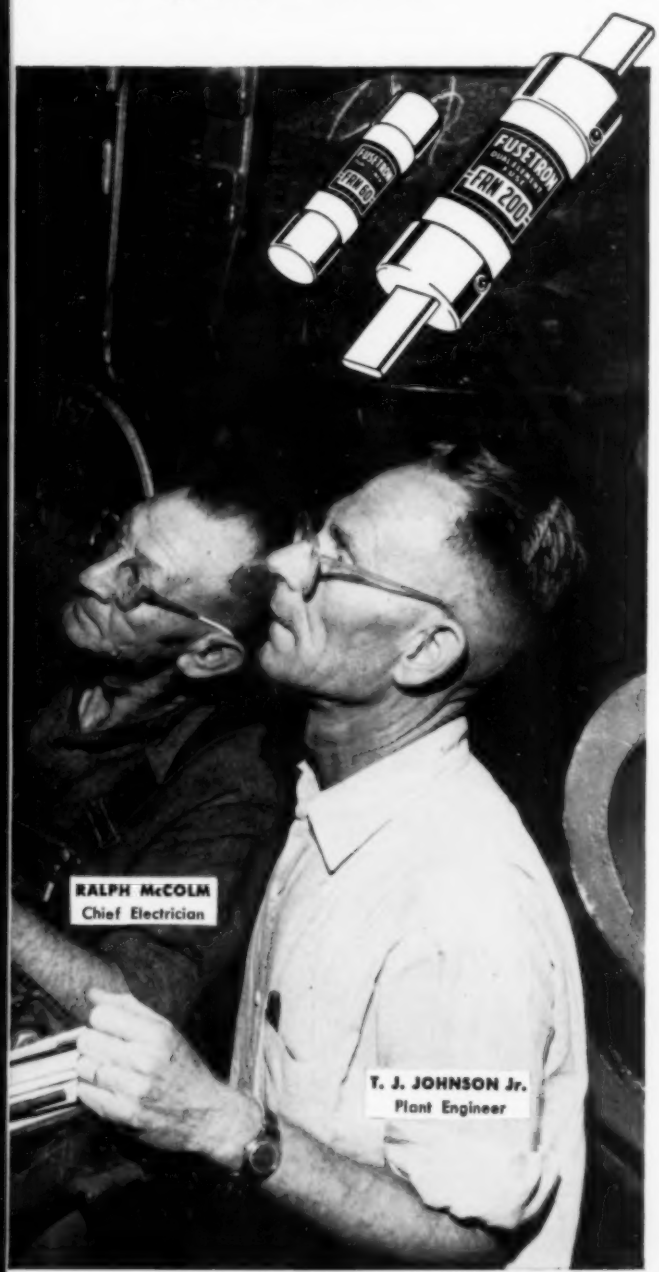
Ralph McColm
CHIEF ELECTRICIAN
BLACK SIVALLS AND BRYSON, INC.
OKLAHOMA CITY, OKLA.



why Fusetron Fuses can protect motors against burnout

Fusetron fuses have a tremendous time-lag. This means, on normal installations, Fusetron fuses can be used in motor-running protection sizes — without opening on motor-starting current or other harmless overloads.

When so used, Fusetron fuses protect motors from any harmful excess of current caused by such things as single phasing, overloading, wrong voltage, being stalled, lack of oil, tight belt, worn bearings or anything that causes the motor to draw a dangerously excessive current.



Fusetron Fuses provide simplest way to prevent damage from single phasing

When single phasing occurs, the current in the remaining phase increases about 100%. (Theoretically 73%, but change in efficiency and power factor makes it about 100%).

This 100% overload on Fusetron fuses of motor-running protection size opens them and stops flow of current to the motor.

FUSETRON FUSES DO MORE THAN PROTECT MOTORS AGAINST BURNOUT

They provide 10 Point Protection

1. High interrupting capacity — protect against heaviest short-circuits. Have proven on tests to open safely on circuits set to deliver in excess of 100,000 amperes.
2. Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation.
3. Protect against needless blows caused by harmless overloads.
4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.
5. Protect against waste of space and money — permit use of proper size switches and panels.
6. Protect motors against burnout from overloads.
7. Give DOUBLE burnout protection to large motors — without extra cost.
8. Protect motors against burnout due to single phasing.
9. Make protection of small motors simple and inexpensive.
10. Protect coils, transformers and solenoids against burnout.

More information on Fusetron dual-element fuses is available. Write for bulletin FIS.

FOR LOADS ABOVE 600 AND UP TO 5000 AMPS. — USE BUSS Hi-Cap FUSES!

On 600 volts or less, they have interrupting capacity sufficient to handle any fault current regardless of system growth.

They can be coordinated with Fusetron fuses on feeder and branch circuits to limit fault outages to circuit of origin.

Write for bulletin HCS.

Play Safe! *Install FUSETRON dual-element Fuses and BUSS Hi-Cap Fuses throughout entire Electrical System!*

BUSSMANN MFG. CO. FUSETRON BUSS Div. of McGraw Electric Co.

University at Jefferson, St. Louis 7, Mo.

WHERE TO GET IT *And How to Do It*

—INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE—

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STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

6 **PACKAGED PLANTS** — Catalog 711 describes how steam at point of use cuts costs for process industries. Packaged generators are fully automatic, burning oil, gas, or both in combination. 18 sizes from 20 to 600 bhp and for pressures to 250 psi. — SUPERIOR COMBUSTION INDUSTRIES.

9 **FREE COAL COUNSELING** — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose. — NORFOLK AND WESTERN RAILWAY.

10 **WATER-COOLED STOKER** — Catalog describes completely water-cooled Vibra-Grate stoker which burns low grade fuels without smoke at either low or high ratings. No dust collectors necessary. — AMERICAN ENGINEERING COMPANY.

39 **PCKG. AUTOMATIC BOILER** — Bulletin 1220 highlights features of Powermaster packaged automatic boilers; sizes to 500 hp; pressures to 250 psi. Factory-assembled units; compact; fuel flexibility. — ORR & SEMBOWER, INC.

42 **SINGLE RETORT UNDERFEED STOKER** — Bulletin 350, 28 pages —Describes an efficient, compact, single retort stoker, mechanically driven either by electric or steam drive for burning successfully various grades of bituminous coal, 50 to 150 hp rated capacity. Replete with installation views and details. Many Southern plants described. — DETROIT STOKER CO.

56 **WATER TUBE BOILERS**—Booklet — Describes details of stoker—oil or gas or combination gas/oil, 10 to 350 hp to 250 psi; designed for easy conversion to any fuel. — QUEEN CITY ENGINEERING COMPANY, INC.

60 **PACKAGED GENERATOR**—Bulletin PG-55-3 outlines features of new generator line in capacities from 10,000 to 46,000 lb/hr. Shipped completely assembled — all ready for fuel, steam and electrical connections.—FOSTER WHEELER.

81 **FLY ASH AND DUST RECOVERY** — Engineering Booklet — Gives data and illustrations on the multiclone mechanical dust collector, showing basic principles and typical application for dust and fly ash recovery. — WESTERN PRECIPITATION CORP.

89 **SOLID - WHEEL TURBINE** — Bulletin S-116 gives complete details on Terry solid-wheel turbo-geared units; blades cannot foul; no need for close axial blade clearance. — TERRY STEAM TURBINE COMPANY.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

106 **COMPRESSOR VALVES**—Bulletin illustrates Voss valves, used to replace original valves in compressors of any size, type, and make. Applications, advantages and efficiency under severe operating conditions outlined. — J. H. H. VOSS COMPANY, INC.

108 **ACTIVE AIR**—Catalog 2046 shows how to put active air to work in buildings and shops. Direct drive exhaust fans, air circulators, and ceiling fans.—EMERSON-ELECTRIC.

116 **AIR & GAS COMPRESSORS** — Form 3132-A shows complete range of centrifugal and reciprocating units used in process and chemical industries — for all pressures from deep vacuum up to 35,000 psi and capacities up to 165,000 cfm. — INGERSOLL-RAND COMPANY.

133 **SEALS FOR PUMPS** — D. R. Rankin, Chief Engineer for Peerless gives an interesting picture of why mechanical seals are replacing packings for centrifugal pumps. — PEERLESS PUMP DIVISION, FOOD MACHINERY & CHEMICAL CORP.

142 **CENTRIFUGAL PUMPS** — Bulletin 720.4 gives interesting facts on the new Multi-purpose centrifugal pump line; specifications and performance curves. — GOULDS PUMPS INC.

158 **SUBMERSIBLE PUMP** — Bulletin 51-5300, 4 pages — Describes and illustrates the "Subette," a small submersible pump designed for low capacities at high heads, from wells six inches inside diameter and up. — BYRON JACKSON DIV., BORG-WARNER CORP.

160 **BOILER FEED PUMPS** — 12 p bulletin 122 describes and illustrates the type BFI high pressure pumps. Design features, service ratings and engineering data included.—PACIFIC PUMPS, INC.

170 **HEAT EXCHANGERS** — Bulletins 120 & 124 describe Aero units which cool liquids & gases by evaporative cooling with atmospheric air, removing heat at rate of input, and precisely controlling temperature. Solves problems of water availability, quality or temperature. —NIAGARA BLOWER CO.

INSTRUMENTS—METERS CONTROLS—REGULATORS

207 **AUTOMATIC OSCILLOGRAPH**—Bulletin describes features of the new RS-9 units which give more channels, faster starting, more types of starting relays, sharper traces, and lower expansion cost. — HATHAWAY INSTRUMENT COMPANY.

209 **LIQUID LEVEL CONTROLS** — Catalog describes controls for almost any liquid, at any pressure, at any temperature. Can be furnished in top-mounting, side-mounting styles, or as external float cage units. Almost unlimited application. — MAGNETROL, INC.

212 AUTOMATIC TEMPERATURE CONTROL—Data sheets describe versatile automatic indicating temperature control offering many sequence combinations — step-heating, heating and cooling, wide limit control, or temperature control plus operation of signal devices. — SARCO COMPANY, INC.

218 LEVEL ALARMS — Bulletin D2 shows how you can operate alarms, fuel cut-out, start and stop pumps safely and accurately with Level-arms. Wide variation of control combinations.—THE RELIANCE GAUGE COLUMN COMPANY.

235 LIQUID LEVELS — Bulletin 532 describes indicator which gives a reliable, automatic reading of storage tank contents. 20" dial in 3 x 10" case saves panel space. No outside power source needed; can be located up to 250 ft from tank. — THE LIQUIDOMETER CORP.

240 TEMPERATURE CONTROL — Bulletin 316 describes Accritem regulator for controlling water heaters, heat exchangers, and processes. Use where pressure and load conditions fluctuate widely and for control of large size valves. —THE POWERS REGULATOR COMPANY.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

302 INCINERATORS — Catalogs on field-erected units (up to 8000 lb/hr) and portable models (135 to 450 lb/hr) show how you can eliminate fire hazards, lost space, and hauling costs.—PLIBRICO COMPANY.

315 TANKS OF STEEL AND ALLOYS —Catalog 102-P&BS — All types of tanks for hot water storage, bulk liquid storage, oil or chemical storage, and other unfired pressure vessel use. — J. J. FINNIGAN CO.

326 GRATING—FLOORING—Catalog, 12 pages — Gives picture story of "Weldforged" steel grating, flooring and stair treads — continuous spiral cross bars, alternating right and left, and slightly above bearing bars, electronically weldforged into inseparable units to insure greater non-skid protection and durability. —KERRIGAN IRON WORKS, INC.

370 WELDING ROD GUIDE — 32 page DirectoRod Guide helps you select from 160 rods those that will give you the largest savings per job, whether production, maintenance or salvage.—EUTECTIC WELDING ALLOYS CORP.

383 STATIONARY VACUUM SYSTEMS — Bulletin A-939, 12 pages —Analyzes the problem of industrial dust and describes complete line of vacuum cleaning equipment designed to combat it. Portable separators, water traps, material intake valves, electric bag shakers, rotary discharge valves, etc. — U. S. HOFFMAN MACHINERY CORP.

386 RIGID FRAME BUILDINGS — 8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bowstring truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

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6	9	10	39	42	56	60	81	89	106
108	116	133	142	158	160	170	207	209	212
218	235	240	302	315	326	370	383	386	405
500	545	552	573	583	596	600	601	614	620
639	666	700	701	711	721	723	841	852	861
888	909	937	R-1	R-2	R-3	R-4	R-5	R-6	R-7
R-8	R-9	R-10	R-11	R-12	R-13	R-14	R-15	R-16	R-17
R-18	R-19	R-20	R-21	R-22	R-23	R-24			

Also send further information on following New Equipment (page 92).

F-1	F-2	F-3	F-4	F-5	F-6	F-7	F-8	F-9	F-10
F-11	F-12	F-13	F-14	F-15	F-16	F-17	F-18	F-19	F-20

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pipe scale, dust, dirt, and condensates. Filter compressed air under all pressures and temperatures. — DOLLINGER CORPORATION.

409 **LUBRICATED PLUG VALVES**—Catalog PV-4 covers operational features. Quarter-turn to open or close; lubricant grooves provide positive seal when valve is closed; when open, seating surfaces not exposed. — THE WM. POWELL COMPANY.

419 **SMALL GATE VALVE**—Multiple applications of small forged steel gate valve noted in Catalog 10. Low maintenance. Sizes from ¼" to 2"; rising stem with yoke or rising stem with inside screw; Pressures from 350 psi at 1000 F to 2000 psi at 100 F. — THE CHAPMAN VALVE MFG. COMPANY.

422 **MOTOR PUMP** — Liquid handling applications described in general bulletin. Sizes from ¼ to 75 hp, 5 to 2800 gpm with heads to 650 ft. — INGERSOLL-RAND.

425 **STEAM TRAP** with only three parts — cap, disc and body described in Bulletin 257. No valve closing mechanisms. Only moving part is solid stainless steel disc. Same trap for all loads and pressures 10-600 psi. — SARCO COMPANY, INC.

429 **EXPANSION JOINTS** — Bulletin EJ-1914 describes Gun-Pakt slip-type joints which give long life—no fatigue failures; packing may be added as necessary, under full steam pressure right on the job — no unpacking, no shutdowns.—YARNALL-WARING COMPANY.

431 **STEAM TRAP BOOK** — 44 page steam trap book plus two reprints —"Flash at Traps" and "Vacuum Isn't Vacuum." — ARMSTRONG MACHINE WORKS.

437 **PIPING FOR PERMANENCE** — Bulletin covers a variety of services where wrought iron pipe saves because it serves longer. Corrosion costs you more than wrought iron.—A. M. BYERS COMPANY.

439 **SELF-CLEANING STRAINERS**—Bulletin 5308 describes units to protect all regulating equipment from dirt and foreign matter; liquid, gas, oil and steam services; sizes ¼" to 10" inclusive; primary service ratings to 2500 psi. — LESLIE CO.

449 **CHECK VALVE** — Bulletin SPI 46 shows how you can combine a Durabla Basic Check Unit with any standard pipe fitting to make a complete check valve. Their interchangeability reduces inventory. — DURABLA MANUFACTURING COMPANY.

461 **REDUCING VALVES** — Data sheets describe Type CV-D (diaphragm) and Type CV-P (piston) reducing valves for application at unlimited pressures for pipe sizes up to 16". Either direct or reverse action; high rangeability. —COPES-VULCAN DIVISION, BLAW-KNOX COMPANY.

483 **UNIONS & SWING CHECKS** — Catalog 11, 24 pages—Gives engineering data and specifications on a complete line of hot forged steel pipe unions and swing check valves. Special section devoted to Double-Start Unions, which provide faster opening and closing. — CATAWISSA VALVE & FITTINGS COMPANY.

Please send me without obligation, free booklets described in the June, 1956, issue of SOUTHERN POWER AND INDUSTRY as circled below.

6	9	10	39	42	56	60	81	89	106
108	116	133	142	158	160	170	207	209	212
218	235	240	302	315	326	370	383	386	405
500	545	552	573	583	596	600	601	614	620
639	666	700	701	711	721	723	841	852	861
888	909	937	R-1	R-2	R-3	R-4	R-5	R-6	R-7
R-8	R-9	R-10	R-11	R-12	R-13	R-14	R-15	R-16	R-17
R-18	R-19	R-20	R-21	R-22	R-23	R-24			

Also send further information on following New Equipment (page 92).

F-1	F-2	F-3	F-4	F-5	F-6	F-7	F-8	F-9	F-10
F-11	F-12	F-13	F-14	F-15	F-16	F-17	F-18	F-19	F-20

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MAINTENANCE PACKING GASKETS, LUBRICATION

500 **LININGS & COATINGS** — Brochure 7008, 4 p. describes company's rubber, neoprene and polyvinyl chloride lining and coating service for pipes, valves, tanks, ducts, vessels, etc. Provide protection against corrosion and abrasion in handling acids, bases, salts and fumes; coatings conductive or non-conductive, soft or hard, suitable for high or low temperature operations. — RADIATOR SPECIALTY CO.

545 **CORRECT LUBRICATION**—"Lubriplate Data Book" shows importance of providing and maintaining proper and economical maintenance of all types of plant machinery thru adequate lubrication. — FISKE BROTHERS REFINING CO.

552 **PACKING REMOVAL TOOL** — Bulletin DHSP describes the Dura Hook that "works around corners" for removing old packing from stuffing boxes. —DURAMETALLIC CORPORATION.

573 **PLASTISPRAY** — Catalog describes sprayed-on vinyl plastic sheeting which provides clean, attractive, maintenance free wall covering for cafeterias, restrooms, etc. Effective on exteriors — cracked and leaking stucco or masonry. Unlimited colors. — WILSON AND MANKIN.

583 **CONDENSATE CORROSION** — Bulletin No. 35, 4 pages — Describes the causes of condensate corrosion in return lines, heaters, tanks and describes methods of stopping it with various Nalco products. Well illustrated. — NATIONAL ALUMINATE CORP.

596 **TUBE CLEANERS & EXPANDERS** — Catalog 77 covers tubes in high pressure boilers, superheaters, economizers and other heat exchange equipment. Model 38 expander rolls and flares in single operation. — THOMAS C. WILSON, INC.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

600 **CONVEYOR IDLERS** — Bulletin SI-116 describes pre-lubricated "UST" Conveyor Idlers. Incorporating Timken bearings and Garlock Klozures, construction permits operating without lubrication for 1-3 years or more. — CONTINENTAL GIN COMPANY.

601 **FLUID DRIVES** — Catalog, 24 pages — Describes and illustrates Type VS Class 4 Gyrol fluid drives. Eight sizes are listed, with speeds to 1800 rpm and 100 to 2500 hp. — AMERICAN BLOWER CORPORATION.

614 **VERTICAL TRANSPORTATION** —Elevator Catalog — Describes and illustrates details of passenger and freight elevators, escalators, dumbwaiters, and modernization and maintenance equipment for use in industrial, utility and service plants. — OTIS ELEVATOR CO.

620 **DOUBLE PITCH CONVEYOR AND POWER TRANSMISSION CHAINS** — Catalog No. 34, 30 pages — Describes American Standard stock chains having figure 8 contour links, and chain pitch twice that of corresponding American Standard roller chains. — DIAMOND CHAIN COMPANY, INC.

639 **MECHANICAL AERIAL LADDER** — 4-page catalog, describing features of Holan Series 2200 ladder, features new band-type brake, duo-level platform and rung construction. — J. H. HOLAN CORPORATION.

USE SPI READER SERVICE

See Service Cards

666 **ELECTRIC POWER DRIVES** — 12 p catalog contains cut-away drawings illustrating various features of variable speed and slow speed gear reduction units, and totally enclosed splash-proof motors. Includes mounting and control information. — STERLING ELECTRIC MOTORS.

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

700 **WATER CONDITIONERS** — 4 p brochure describes Anco water conditioners for hot-water and humidifying systems. Stop rust and corrosion; prevent discolored water. — ANDERSON CHEMICAL COMPANY, INC.

701 **EXHAUSTING CORROSIVE FUMES** — Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans. — CLARAGE FAN CO.

711 **REFRIGERATION CONDENSERS** — Bulletin RC-2 shows how Vogt condensers step up rate of heat transfer and step down head pressures. Closed type for clean waters; film type where water is hard and forms scale. Units save power and refrigeration cost.— HENRY VOGT MACHINE COMPANY.

721 **WHAT TYPE COLLECTOR** — Reprint 102 discusses control of industrial dusts and flyash and features P-D Collector Systems. — THE THERMIX CORPORATION.

723 **DUST COLLECTION** — Catalog describes mechanical and electrical systems which meet most rigid anti-air-pollution codes; low resistance flyash collector which combines top efficiency with low draft loss, for natural or forced draft installations. — BUELL ENGINEERING COMPANY.

ELECTRICAL

841 **APPLYING ELECTRIC HEAT** — "101 Ways to Apply Electric Heat" — Gives illustrated case histories showing experience-tested methods of applying Chromalox electric heating elements. Physical aspects of installation are shown along with the description of the problem, solution and advantages obtained.—EDWIN L. WIEGAND CO.

852 **AUTOTRANSFORMER STARTER** with air break contacts up to 75 hp, 220 v; 150 hp, 440-550 v is described in Bulletin 646. Silver alloy contacts stay in good condition without filing, cleaning or dressing. — ALLEN-BRADLEY.

861 **ELECTRICAL PROTECTION SYSTEM** — Bulletin HCS — Describes "Fusetron" dual-element fuses which save recalibration and maintenance costs. Eliminates down-periods caused by needless blows and saves on installation costs. Available in all sizes from 1/10 to 600 amperes, both 250 and 600 volt types. Also in plug types for 125 volt circuits. — BUSSMANN MANUFACTURING COMPANY.

888 **VARIABLE SPEED ELECTRIC POWER DRIVES** — Bulletin 171, 4 pages — Gives details of modern variable speed electric power drives, with engineering details of design and application. — STERLING ELECTRIC MOTORS.

OPERATING AIDS SUPPLIES & MISCL.

909 **INDUSTRIAL SKIN CLEANSER** —Folder describes VI-Lan Clean, a non-alkaline, non-acid, all-purpose, antiseptic skin cleanser that prevents dermatitis and other skin conditions. Self-service dispensing units. — DAMERON ENTERPRISES, INC.

937 **STEEL MEASURING TAPES** — Complete catalog describes full line of measuring tapes from 6 to 100 ft, including wide blade tape with upright measurements. — EVANS RULE CO.

EASIEST MAINTENANCE

of any high-pressure steel valve

LUNKENHEIMER BREECH LOCK

BREECH LOCK
1500 lb. S.P.
Cast Steel Gate

Here is the *only* seal-weld valve that gives you all the pressure tightness of a full-strength welded bonnet—plus the *extra* advantage of ready disassembly and reassembly on the job.

The patented body-bonnet Breech Lock design is similar in principle to the breech pattern of an artillery piece. There are no gaskets, bolts, flanges, or threads to wear out—nothing to cause leakage. Operation of the Breech Lock Valve is unaffected by rapid temperature changes.

HERE'S HOW IT WORKS

Precision machined breech lugs in the body and bonnet interlock to carry the most severe internal pressure loads with even stress, and assure perfect alignment of valve parts. By turning the bonnet 45°, the lugs disengage with ease for convenient disassembly without removing the valve body from the line. A seal weld between body and bonnet assures perfect tightness, since it is not subjected to high stresses. All the load is on the lugs. This weld can be rapidly chipped out when disassembly is necessary—and easily replaced. Breech Lock valves require far less maintenance—cut "downtime" to the absolute minimum.

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QUALITY

For complete information, call your Lunkenheimer Representative or write The Lunkenheimer Company, Box 360, Cincinnati 14, Ohio.

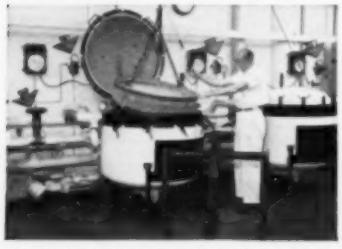
STEEL • IRON • BRONZE • PVC

LUNKENHEIMER®

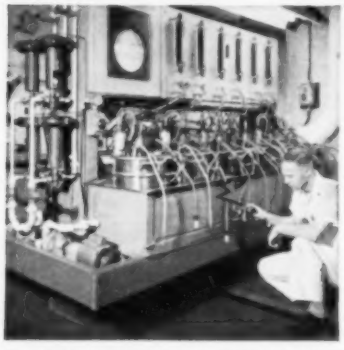
THE ONE *Great* NAME IN VALVES

L-555-10

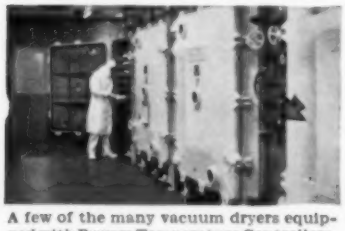
Shaker room and incubator in Fermentation Department. Powers Temperature Recording Controllers are used here.



Ampoule Sterilizers regulated by Powers No. 252 Pressure Regulators and Valves.



Fermentation process in research pilot plant controlled by Powers ACCRITEM Regulators and FLOWRITE Valves.



A few of the many vacuum dryers equipped with Powers Temperature Controllers.

Below: Air Conditioned Room for Board of Directors and executive conferences.

POWERS

AUTOMATIC temperature, humidity and pressure control

.... helps Abbott Laboratories bring better health to millions

Heating and Air Conditioning in many of the above buildings are automatically regulated by Powers Temperature and Humidity Control Systems.

Research at Abbott's has paid off in an unbroken dividend record, numerous stock dividends and splits. Many of their famous products such as Nembutal, Pentothal, Erythrocin, Iberol, Vi-Daylin, Selsun and Sucaryl have been developed in laboratories equipped with Powers control.

Versatility of Powers control used at Abbott's is indicated by some of the applications shown here and in the following installations: Air conditioning control systems for auditorium with 900 seating capacity, executive offices and dining room, cafeteria and animal rooms; also controls for tablet machines, demineralized water heaters, autoclaves and many other applications.

When you need automatic control for temperature, humidity or pressure, call your nearest Powers office or write us direct. An experienced Powers engineer will gladly help you select the right type of control for your requirements.

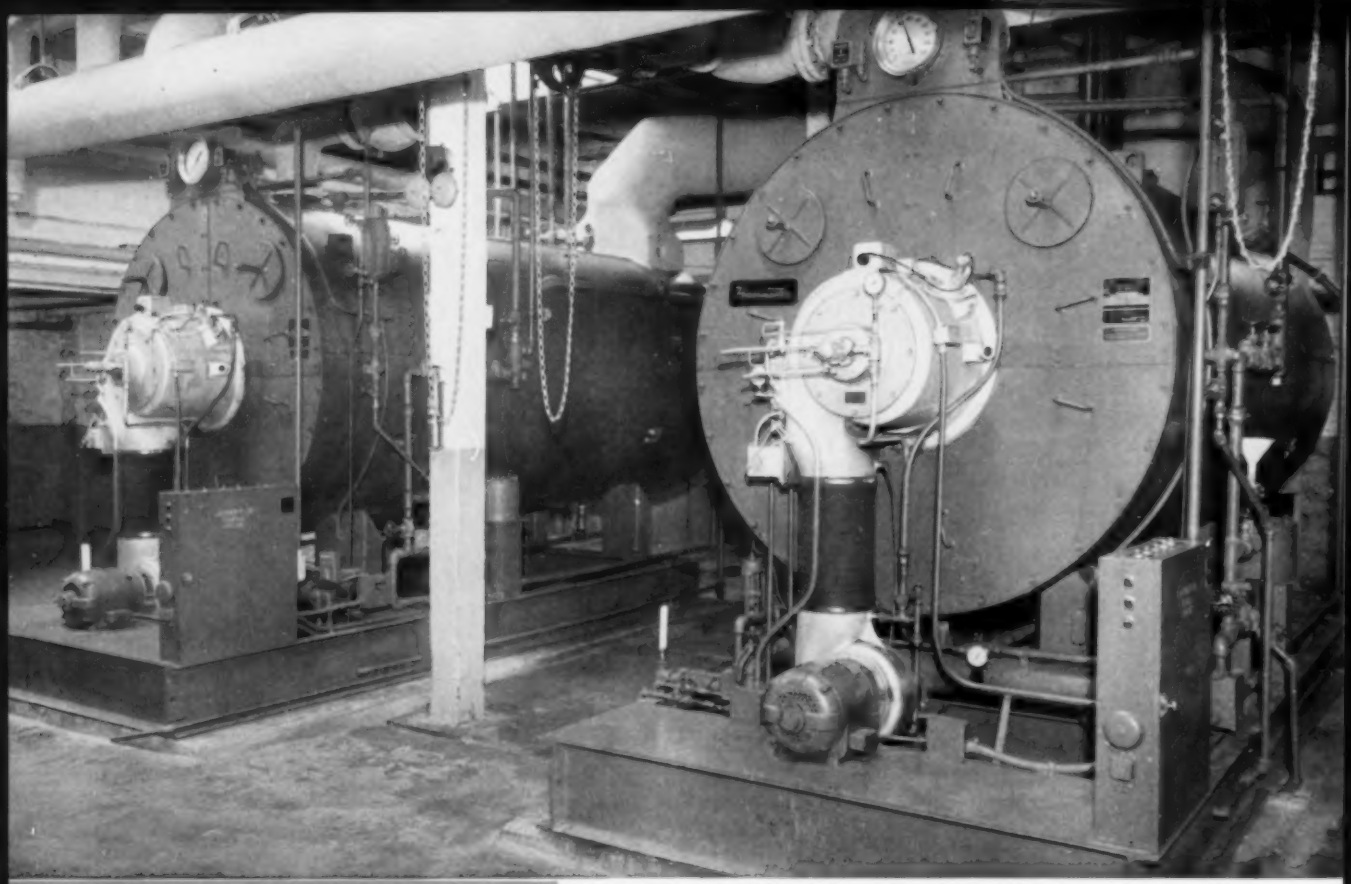
(c42a)

THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS | *Offices in chief cities in U.S.A., Canada and Mexico*

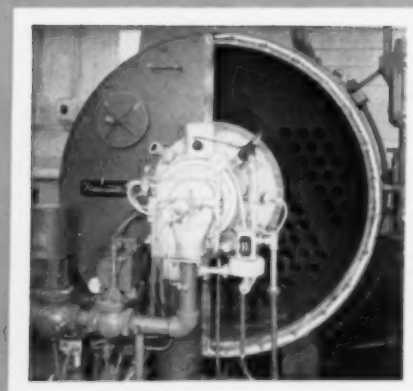
Over 60 years of Automatic Temperature and Humidity Control

SOUTHERN OFFICES — Atlanta 9, Georgia, 1333 Spring St., N.W., Phone Elgin 2673 • Birmingham 9, Ala., TR 1-2866 • Charleston 3, W. Va., 65-363 • Charlotte 3, N. C., Edison 2-3395 • Chattanooga, Tenn., 6-5645 • Miami (Coral Gables), Fla., 83-3885 • Greensboro, N. C., 5-6464 • Jacksonville, Fla., Elgin 6-5601 • Louisville 2, Ky., Wabash 6842 • Memphis 3, Tenn., 8-4406 • Nashville 3, Tenn., Alpine 6-3223 • New Orleans 19, La., Bywater 2751 • Washington, D. C., National 8-3570.



WHY TWO?

Powermaster® PACKAGED AUTOMATIC BOILERS



Time-saving inspection and cleaning of *Powermaster* is provided by easy removal of sectioned front cover without disturbing burner, accessory equipment or piping; by convenient handholes; and by easily removable rear cover. This simple and complete accessibility is a big advantage in maintaining clean, efficient operation over the entire life of *Powermaster* units.

• Major operating advantages are gained by installing two or more *Powermasters* rather than a single large boiler. These include greater assurance of a constant steam supply, increased flexibility of operation, more efficient light load standby, reserve capacity for extra-heavy load demands and for rapid expansion, greater freedom from downtime for inspection and maintenance.

Sizable cost economies also are effected because of *Powermaster's* simplified installation, space-saving compactness, automatic time-saving operation, fast steaming and quick response to load swings, high fuel economy at all loads, maintenance-saving accessibility and other service-proved features.

These are reasons why multiple *Powermaster* installations are now serving numerous manufacturing industries, institutions, public buildings, schools, housing projects, laundries, military posts and other steam users.

Be sure you take a close look at *Powermaster* advantages whenever you're looking for a dependable, low-cost steam supply for any plant or building requirement. Ask for Bulletin 1220.

Powermaster®

PACKAGED AUTOMATIC BOILERS

Sizes to 500 hp.; pressures to 250 psi

Builders of Dependable Boilers Since 1885

ORR & SEMBOWER, INC.

Morgantown Road, Reading, Pa.

(*News Continued*)

Aerovent Fan Company Manager Propeller Division

Al. W. Roth has been appointed Manager of the new Large Propeller Division of **Aerovent Fan Company, Inc.**

Mr. Roth, who has been prominent in Aerovent's large propeller development program since 1939, has served in a sales engineering capacity for the company throughout the Southwest and will continue to maintain offices in the Wright Building at **Tulsa, Oklahoma** and at Piqua, Ohio, site of the main office and factory of the parent organization.

Johns-Manville Names Gulf Coast Contractor

The Industrial Insulations Division of **Johns-Manville** has named the **Thorpe Insulation Company** as its Insulation Contract Unit in the **Gulf Coast Area.**

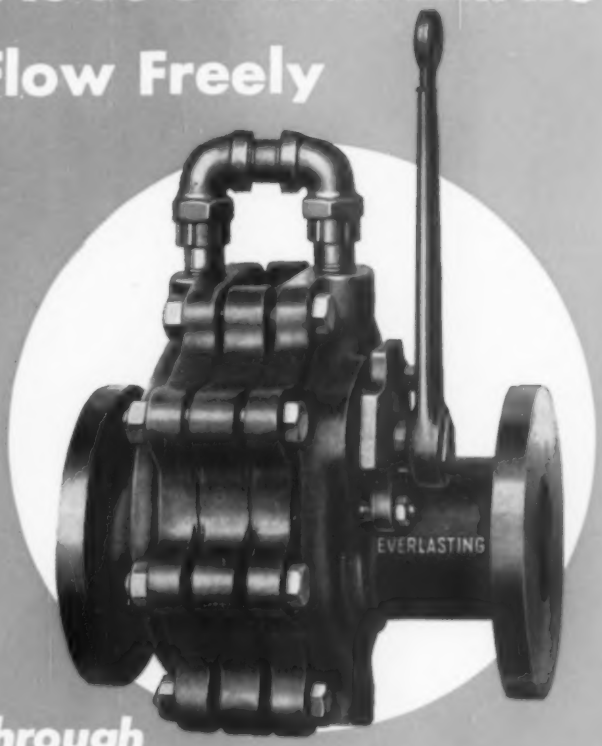
In its new capacity the Thorpe Insulation Company, which maintains offices at Houston, will handle contract installations of Johns-Manville insulating materials in this area.

President and General Manager of the Thorpe Insulation Company is **W. R. Downs,** who will head a staff of experienced insulation engineers, estimators and mechanics trained in Johns-Manville's methods of insulation application. Modern shop and fabricating facilities, as well as complete stocks of industrial insulations will be maintained.

The new Contract Unit will be backed up by the engineering and sales staff of the Johns-Manville Houston regional office headed by **C. B. Hann,** Regional Manager, and **R. A. Stapleton,** Area Sales Manager.

(*Continued on Page* 34)

VISCOUS MATERIALS Flow Freely



through Steam-Jacketed EVERLASTING Valves

The EVERLASTING Steam-Jacketed Valve has proven outstandingly successful in handling many different kinds of viscous materials, such as tar, asphalt, pitch, paraffin, waxes, molten sulfur, etc.

Available in sizes 1½ in. to 6 in. inclusive, in iron body for 125 psi and cast steel for 150 psi.

For further details, write for Bulletin E-200.

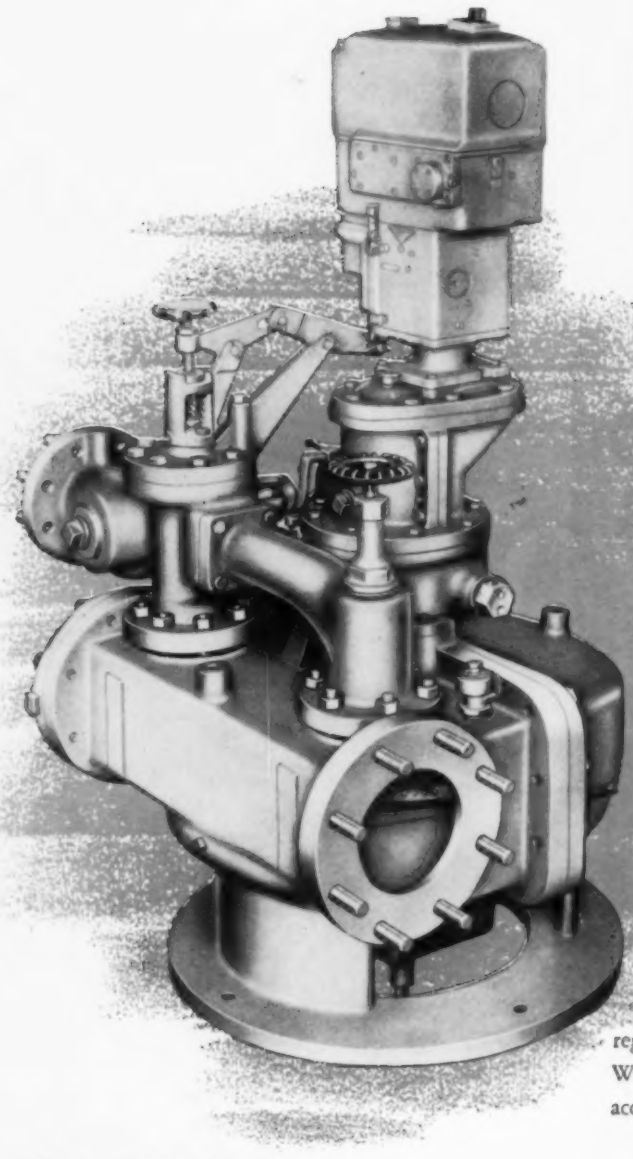
For "everlasting" service, use

EVERLASTING Valves

EVERLASTING VALVE CO.
53 FISK STREET, JERSEY CITY 5, N. J.

EV200

where speed control counts



DH *turbines deliver accurate speed control where you need it.*

Ideal for all drives requiring extremely close speed regulation, Dean Hill Steam Turbines equipped with Woodward Type PG Governors guarantee maximum accuracy.

This governor is adaptable to either the vertical or horizontal Dean Hill Turbine, and unlike most types of governors, it is "isochronous", holding a steady speed within a band of 0.1% to 0.03% over an extremely wide range of turbine speed, regardless of the load on the pump. All DH Turbines come equipped with over-speed trip valve.

For further information on D-H Turbines and optional accessories

write today for Catalog 500.

DEAN DH HILL PUMP COMPANY

Pump and Turbine Engineers Since 1893

Indianapolis 7, Indiana

Sales Offices In:

Chicago, New York, Seattle, Birmingham, Ala., Knoxville, Louisville, Memphis, Boston, Springfield, Ill., St. Louis, Kansas City, Cincinnati, Albuquerque, Casper, Wyo., Salt Lake City, El Paso, New Orleans, Denver, Washington, Toledo, Minneapolis, Grand Rapids, Los Angeles, San Francisco, Pittsburgh, Dallas, Houston, Cleveland, Philadelphia, Tulsa, Marshall, Texas, Mimico, Ont., Montreal, Vancouver, Reading, Pa., Santurce, Puerto Rico.

BOOM LOADING "GENTLES" THE COAL INTO WAITING CARS . . .
MAINTAINS INITIAL SIZING AND BANS DEGRADATION

BEACON COAL

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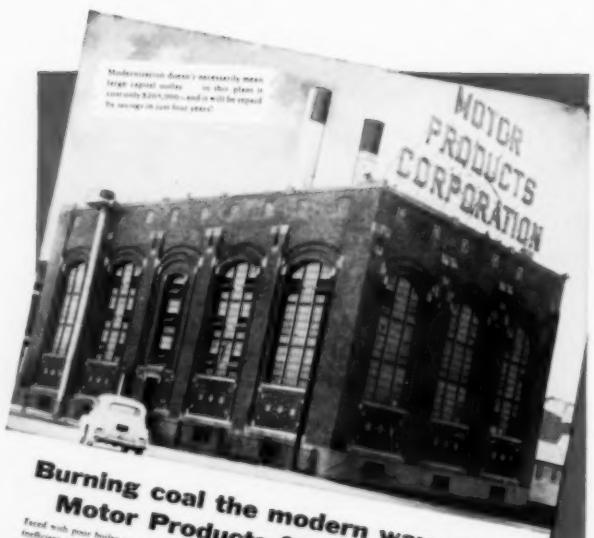
Detroit RotoStokers Type C-C —Important in Savings by this Modernization Award Winner

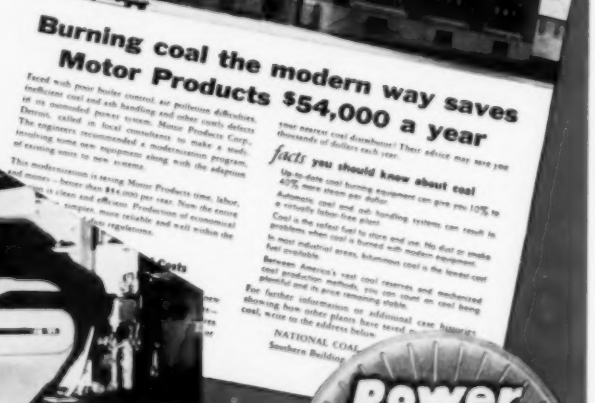
Motor Products Corporation, Detroit, won a "Power" Modernization Award with a program in which Detroit RotoStokers, Type C-C played an important part. Savings will pay for the investment in four years.

The Type C-C is a spreader stoker that automatically cleans the fuel bed and discharges the ash continuously at the front. It operates without smoke through a wide load range — important to a plant located in the midst of a city, such as Motor Products Corporation.

Let us tell you more about the economies available with Detroit RotoStoker, Type C-C.

Write for Bulletin — No Obligation.





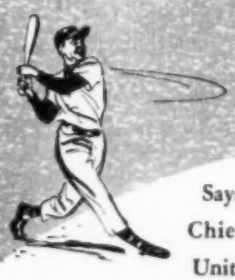
Power MODERNIZATION PROGRAM

Motor Products Corporation—Detroit
R. B. Gilray, Plant Engineer.

Boddy, Benjamin & Woodhouse Inc.,
Detroit, Consulting Engineers.

DETROIT STOKER COMPANY
GENERAL MOTORS BLDG. — DETROIT 2, MICH.
DISTRICT OFFICES IN PRINCIPAL CITIES — WORKS AT MONROE, MICH.

"You can't get a Better Boiler Box Score"



Says Stanley D. Loomis, Chief Engineer of The United Piece Dye Works, a leader in the field of textile dyeing, finishing and printing. Of course, he's referring to the C-E Package Boiler, Type VP—installed in the newest and most modern United Piece Dye Mill at Charleston, South Carolina. His box score for 1955 appears at the right.

SCORE CARD

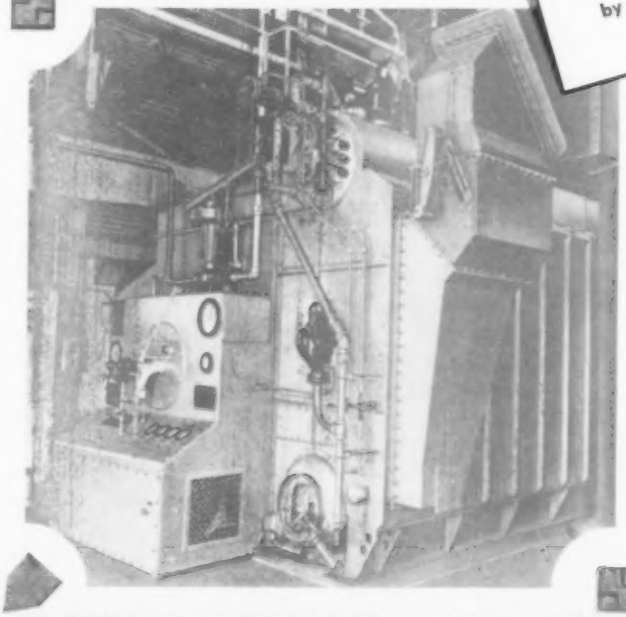
AT BAT
3 shifts a day, 6 days a week without a single unscheduled outage.

RUNS
around the clock with a quick response to load change and an ability to sustain a high overload capacity while producing high quality steam.

HITS
the performance mark. C-E's prompt service and complete cooperation matches the quality of the boiler.

PUT OUTS
of maintenance and repair bills are assured by the boiler's conservative design and built-in advantages. To date there have been no repair bills at all.

ASSISTS
in the continued full-production operation of the plant by meeting every steam need unfailingly.



Need a Package Boiler? See C-E! You can't get a better boiler box score.

B-911A

COMBUSTION ENGINEERING

Combustion Engineering Building — 200 Madison Avenue, New York 16, N. Y.

CANADA: COMBUSTION ENGINEERING-SUPERHEATER LTD.

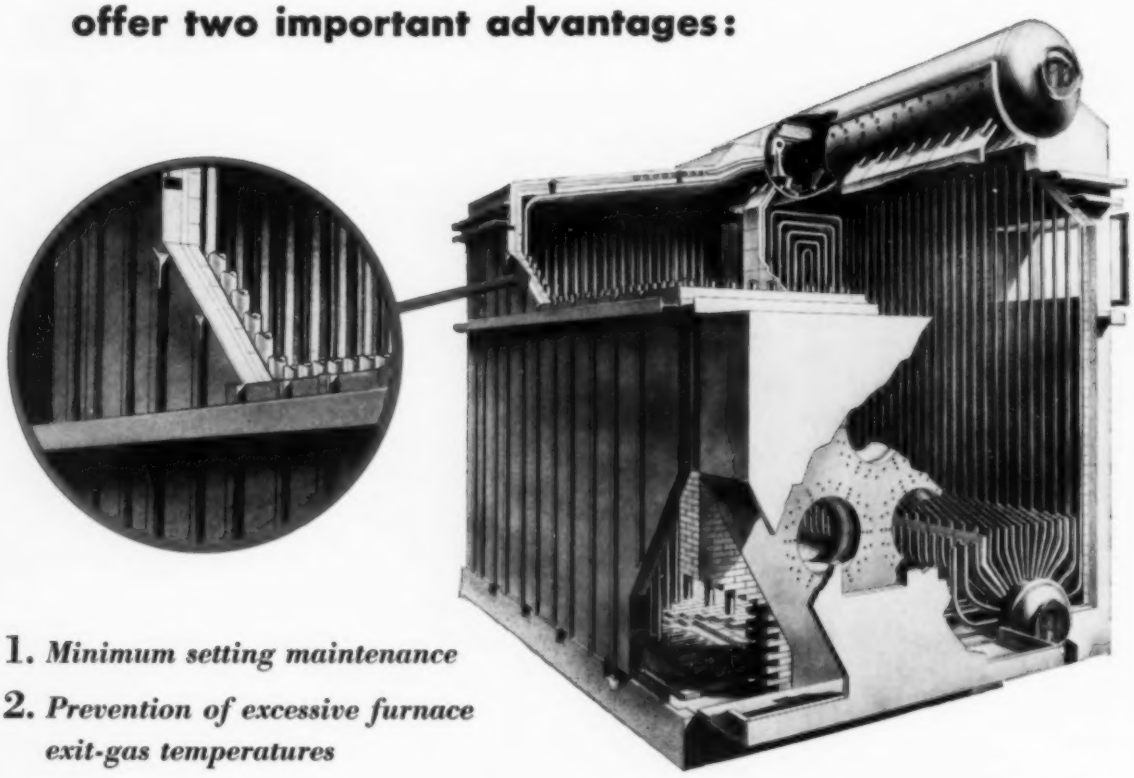
STEAM GENERATING UNITS • NUCLEAR REACTORS • PAPER MILL EQUIPMENT • PULVERIZERS
FLASH DRYING SYSTEMS • PRESSURE VESSELS
HOME HEATING AND COOLING UNITS • DOMESTIC WATER HEATERS • SOIL PIPE

C-E

Another Feature of the FW Series "SC" Standard Boiler...

COMPLETELY WATER-COOLED WALLS

offer two important advantages:



1. *Minimum setting maintenance*
2. *Prevention of excessive furnace exit-gas temperatures*

All furnace walls of this Series "SC" Steam Generator are water-cooled by closely-spaced 3" OD tubes. As a result, setting maintenance is minimized and excessive furnace exit-gas temperatures prevented. The tubes are backed by first-quality refractory, heavy-duty insulation and fully-stayed steel casing.

This is another advanced-design feature of the Foster Wheeler Series "SC" Steam Generator that has been developed primarily for reducing power and process steam costs in industrial plants.

Series "SC" employs a standardized design. Dimensions and structural details are fixed. Yet the design provides a wide choice of working temperatures and pressures, balanced draft or pressurized firing, type and location of heat recovery equipment, type and location of fans and drives, oil or gas firing. This means that the "SC" boiler and its auxiliary equipment can be properly integrated to meet your individual plant needs.

FW Series "SC" Steam Generators are available for oil or gas firing, in capacities from 50,000 to 150,000 lb./hr., for pressures to 1500 psi and superheated steam temperatures to 950 F.

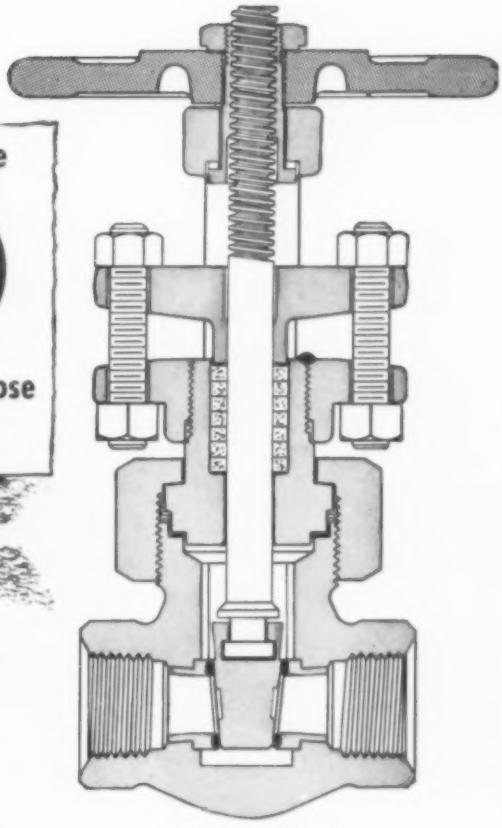
For further information, write *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

OTHER FEATURES AT A GLANCE

- Over 19-foot firing depth
- Unrestricted circulation
- All-welded casing
- Fully drainable superheater
- Efficient convection surface
- Bottom supported unit
- Steam purifying system
- Full insulation

FOSTER WHEELER

NEW YORK • LONDON • PARIS • ST. CATHARINES, ONT.



G-P series 5-9530

Hard faced* Seating

. . . at no extra cost!

STELLITE *faced seating surfaces* are among the many plus advantages offered by Vogt General Purpose Valves. Fusion welded to the removable stainless steel seat rings of gate valves and to the integral seat of globe and angle valve bodies, tough, long-wearing STELLITE affords amazing resistance to erosion, corrosion and galling.

The new line of Vogt drop forged steel GP's completely fills the demands of industry for a line of compact, lighter weight, shorter face-to-face valves. They assure operation economies and longer life and are available in a complete range of sizes and types from ¼" to 2". They are rated 800 pounds at 850°F. and 2,000 pounds at 100°F. Send today for free catalog.

Adv. No. 2 in a series describing the features of Vogt G-P Valves.

Write for your FREE COPY of Supplement No. 1 to Catalog F-9, Dept. 24-FS.

HENRY VOGT MACHINE CO.
P. O. Box 1918 • Louisville 1, Kentucky

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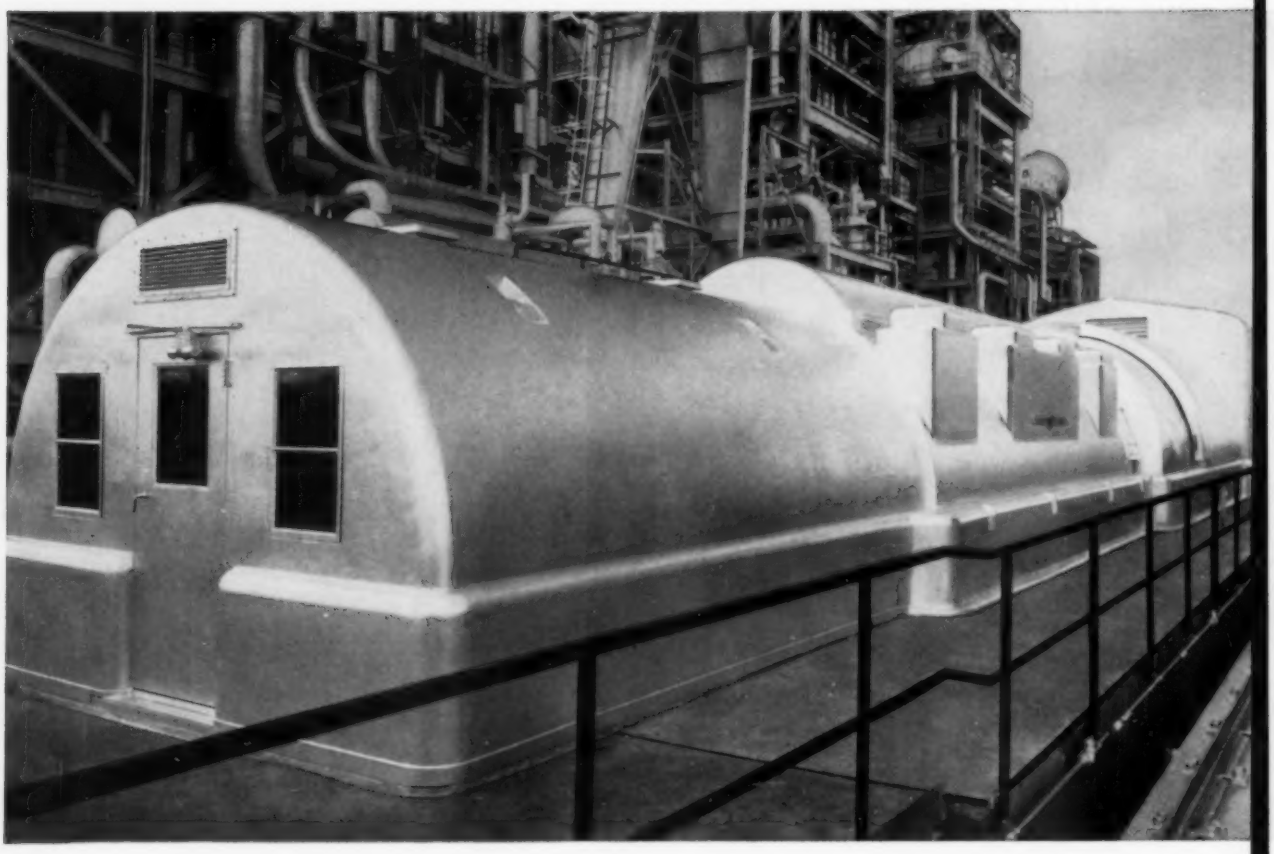
New York, Philadelphia, Cleveland, Chicago, St. Louis, Charleston, W. Va., Cincinnati, Dallas, San Francisco

Vogt GENERAL GP PURPOSE Vogt FOR BETTER VALVES

DROP FORGED STEEL

VALVES



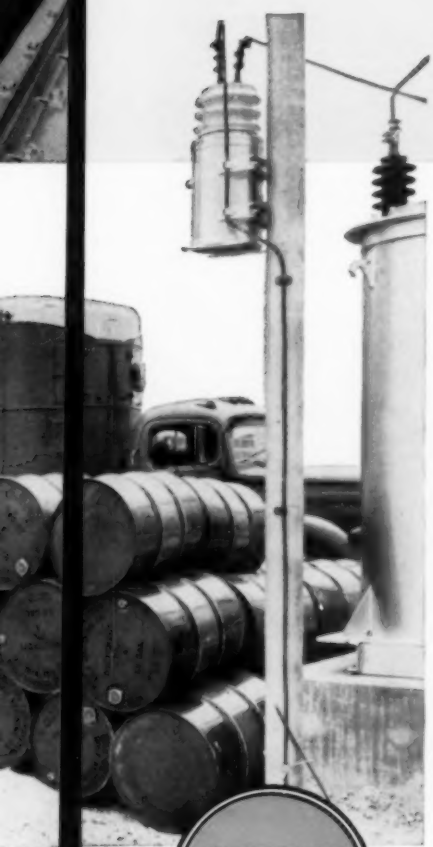
Part of the 100-drum shipment of Gulfcrest Oil which will lubricate the new 150,000 kilowatt turbine. This brings the total output of the Cutler Plant to 370,000 kilowatts. All turbines are lubricated with the finest in turbine oils—Gulfcrest.

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

Past performance proved it best...

GULFCREST OIL

selected to lubricate another big turbine at Florida Power & Light Company



When the Florida Power & Light Company recently installed the new 150,000 kilowatt General Electric turbine in its ultra-modern Cutler Plant, the choice of a lubricant was no problem. The outstanding past performance of Gulfcrest in the four other units in the plant made it a natural selection.

Gulfcrest Oil has a background of superior performance in other Florida Power & Light Company plants, and in scores of other prominent utilities throughout Gulf's marketing territory. Here's why:

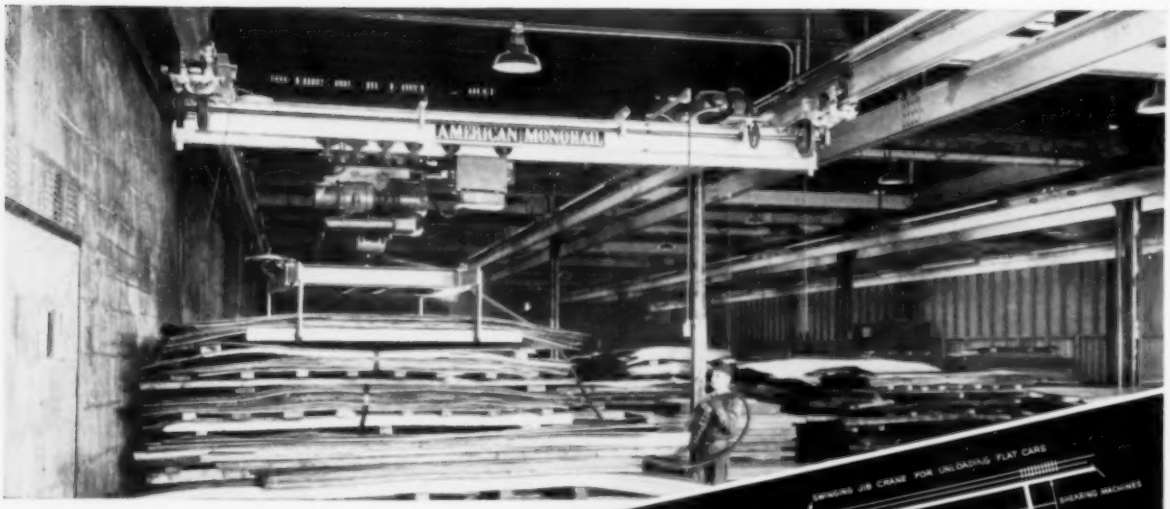
Gulfcrest Oil is super-refined by Gulf's exclusive Alchlor Process, which removes the unstable hydrocarbons that remain after normal refining. This discarded portion, if allowed to remain in a turbine oil, accelerates oxidation, increases neutralization number, forms sludge and harmful acids.

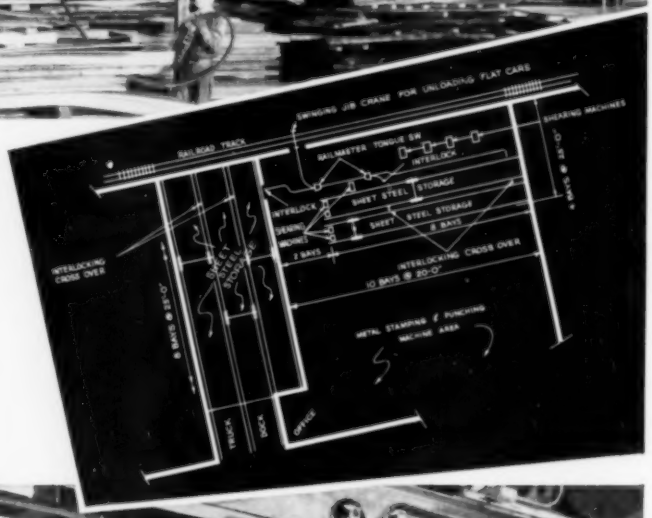
So to insure safe, long-lasting protection for your turbines, specify Gulfcrest—the world's finest turbine oil.

Call a Gulf Sales Engineer today and have him recommend the proper grade of Gulfcrest Oil to meet the specific requirements of your turbines. Consult the telephone directory for the number of your nearest Gulf office.

GULF OIL CORPORATION • GULF REFINING COMPANY
1822 Gulf Building, Pittsburgh 30, Pa.

GULF





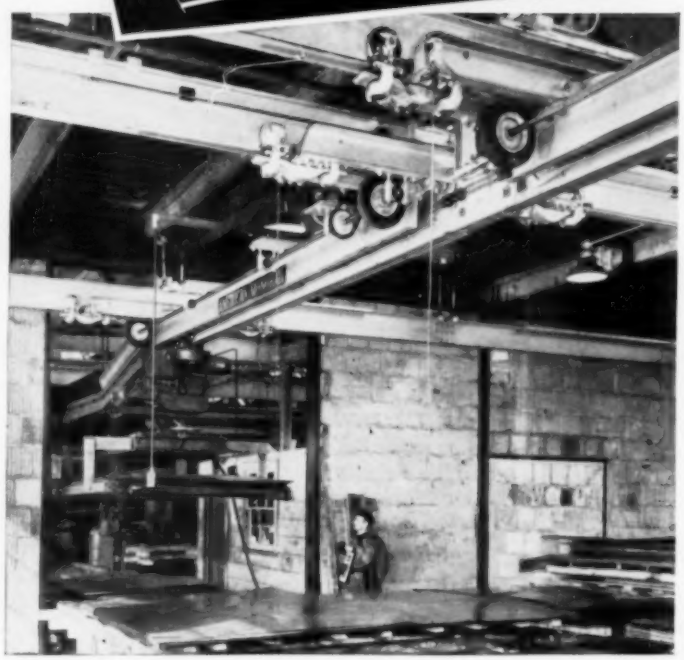
handles 200 tons more steel per day with AMERICAN MONORAIL

The Hamilton Steel Products Company of Chicago now handles 250 tons of sheet steel per day with American MonoRail cranes as compared to 50 tons by previous methods. An increase of 400%.

This is just another example of cost savings with improved handling methods which are regularly realized by American MonoRail users. If you have a materials handling problem call your American MonoRail representative or write us today.

Send for Bulletin SC-1.

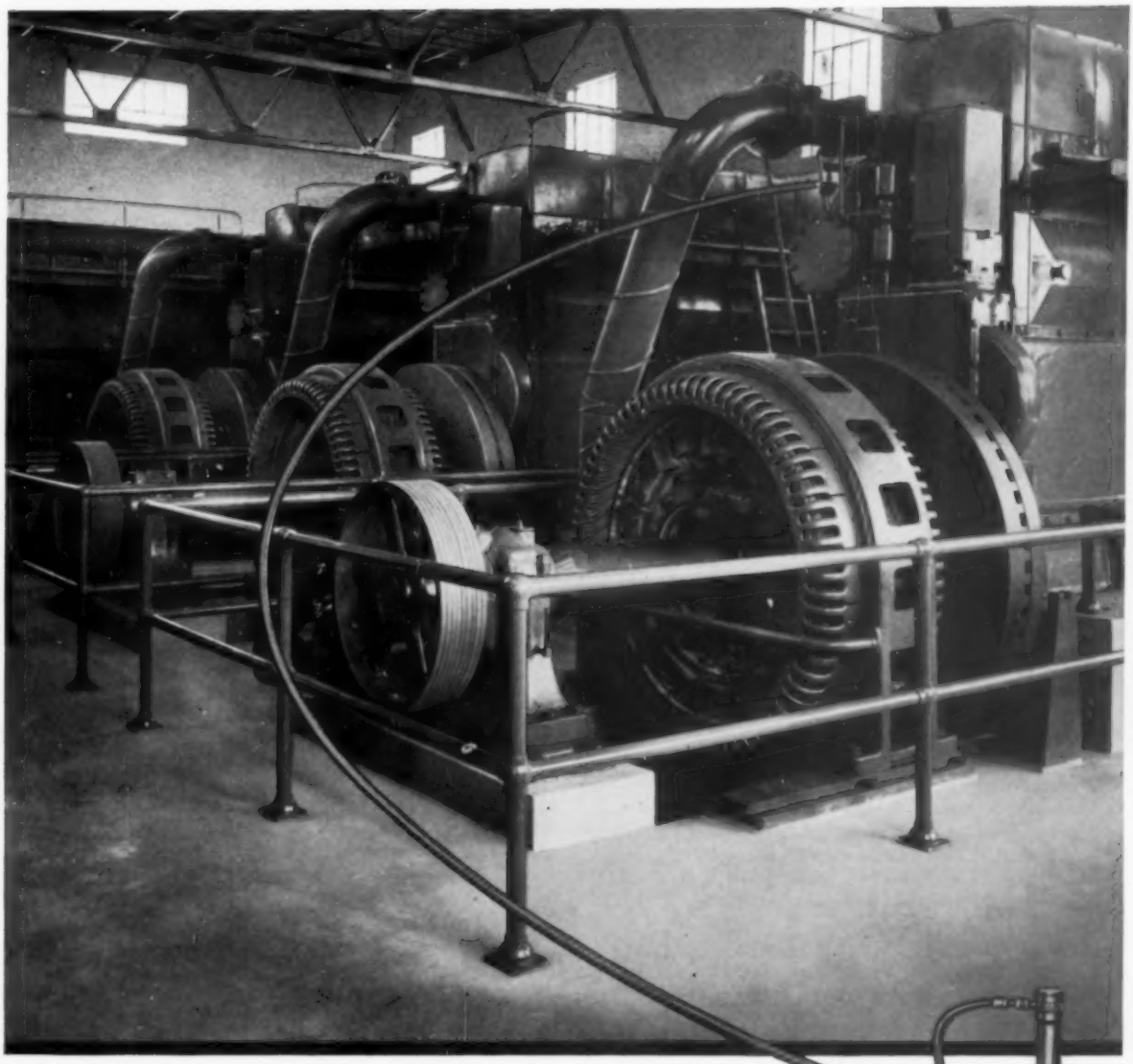
Member of Materials Handling Institute and MonoRail Association



AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY 13105 ATHENS AVENUE CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]



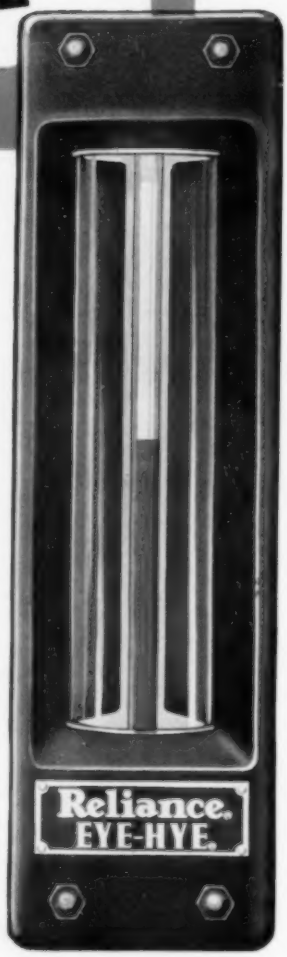
NO STUCK RINGS!

Stop the formation of varnish, sludge and carbon in your Diesels and *keep it stopped* with Sinclair RUBILENE®, the high viscosity index oils proved by over 35 years in industrial Diesel applications. RUBILENE earns its reputation by its performance under continuous operation and heavier loads. It fights deposits and gives better protection to cylinders, pistons, rings and other vital moving parts. Your Diesel stays on the job longer . . . service time is cut 'way 'way down!

Let RUBILENE help solve your lubrication problems. Regardless of the make or age of your Diesel, where a high VI oil is needed, there's a member of Sinclair's RUBILENE or RUBILENE HD family that meets your requirements exactly. Call your local Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Ave., New York 20, N. Y. *There's no obligation.*

SINCLAIR RUBILENE OILS

Newly Styled—
Wide Vision, Simplified Face
EYE-HYE®

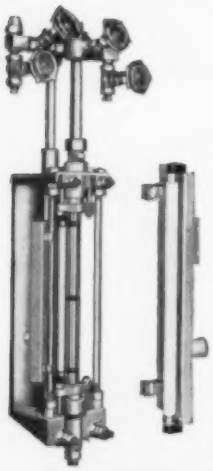


The Reliance Remote Reading Water Level Indicator

Accurate "liquid column" reading visible from large area because of brilliantly illuminated green liquid and wide angle face plate.

EYE-HYE is the original trouble-free manometric gage for dependable remote water level supervision. There's nothing new about its *operation*, but the new face plate and new illumination (fluorescent) make it easier to read all over the control room.

Simplicity is the secret of EYE-HYE's dependable full-range accuracy — no mechanical working parts — no adjustments on location. Supplementary alarms — lights or horns — can be added by equipping EYE-HYE with Reliance EA9-R Levalarm. Models for any remote gage need — any pressure. Write for Bulletin CO.



Fluorescent Illumination

Even lighting the entire length of the gage window is provided by a fluorescent tube. The fluorescent unit is available separately for installation in all but very old EYE-HYE models in use. Write for prices; mention the model number found on name plate.

THE RELIANCE GAUGE COLUMN CO.
5902 Carnegie Avenue, Cleveland 3, Ohio

(*News Continued*)

Spee-Flo Company—Houston

George Peters has been named director of promotions for the **Spee-Flo Company**, 720 Polk, **Houston, Texas.**

Peters has been associated with publicity, advertising and sales promotion fields for the past 15 years in the Southwest, and has resided in Houston since 1949.

Spee-Flo manufactures spray paint heaters used in the hot spray process in the industrial, construction and automotive fields. Peters will coordinate and direct publicity and advertising for the company.

Ferguson Gear Installs Heat Treating Service

The South's first electronically controlled heat treating service for gears has been inaugurated in **Gastonia, N. C.**, by **Ferguson Gear Company.**

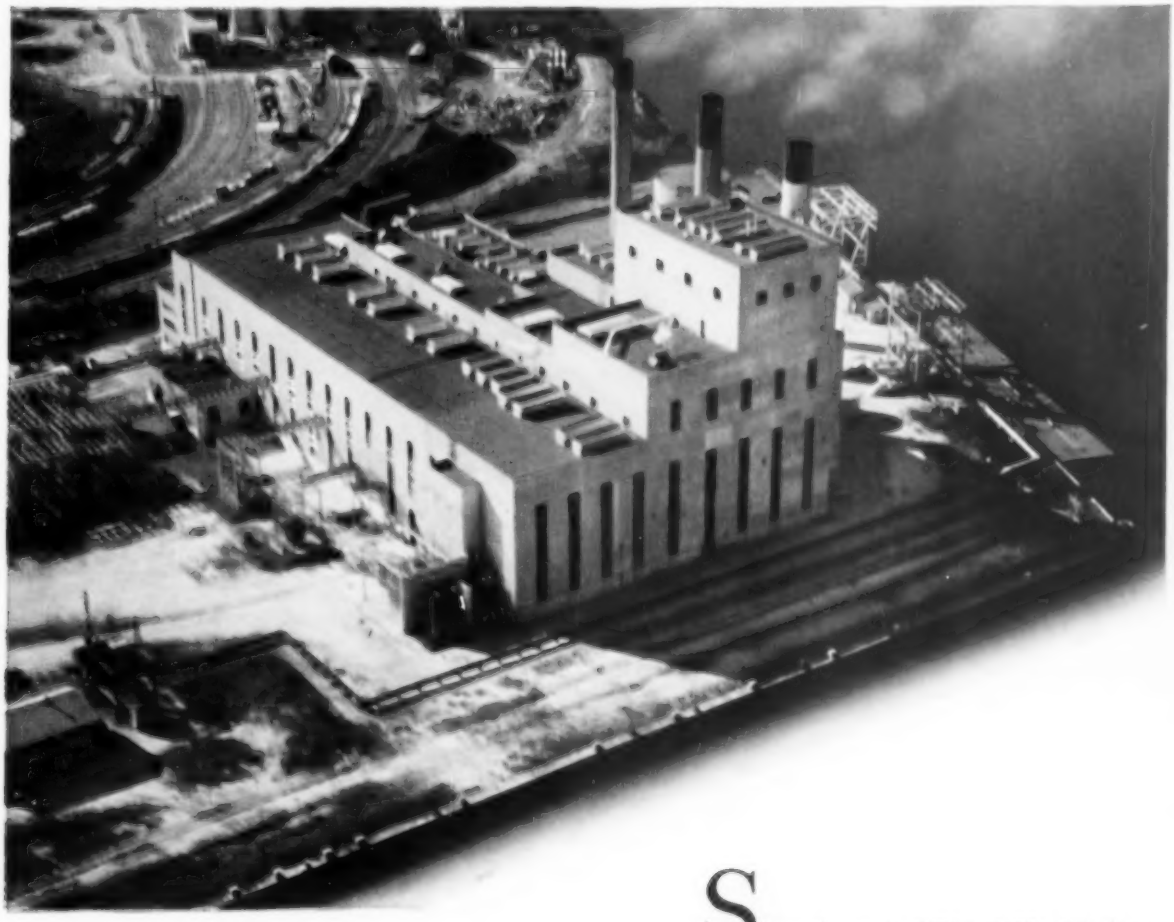
Research studies in the radiant hardening process employed by Ferguson, indicate gear life up to four times that of similiar gears that are untreated or poorly treated by conventional methods.

The intense heat generated by a scientifically controlled mixture forced through specially designed burner heads, is monitored by an electronic heat detector focused on the slowly rotating gear. Thus the hardening is 100% uniform from gear to gear as well as from tooth to tooth.

The Ferguson installation will handle gears from a diameter of a few inches, to 17 inches, and from minimum face widths of ½" to 6 inches.

More News — Page 84

MEETING TAMPA'S DEMAND FOR POWER



The new 66,000 kilowatt unit at Hookers Point includes the first large pressurized furnace boiler installation in this country. Steam is delivered at 1250 psi and 950° F.

Since the end of World War II, the demand for electric power in Tampa, Florida, has increased nearly 500 per cent. To keep pace with this phenomenal load growth, Tampa Electric Company recently completed a 66,000 kilowatt addition to its Hookers Point Power Station.

The initial installation at Hookers Point in 1948 consisted of a single unit of 30,000 kilowatts. In 1950 two additional units of similar capacity were installed, and in 1952 a fourth unit of 44,000 kilowatts was added.

With the completion of the new unit in 1955, the total capability of Hookers Point is now approximately 240,000 kilowatts.

Design and construction of the entire station was by Stone & Webster Engineering Corporation.

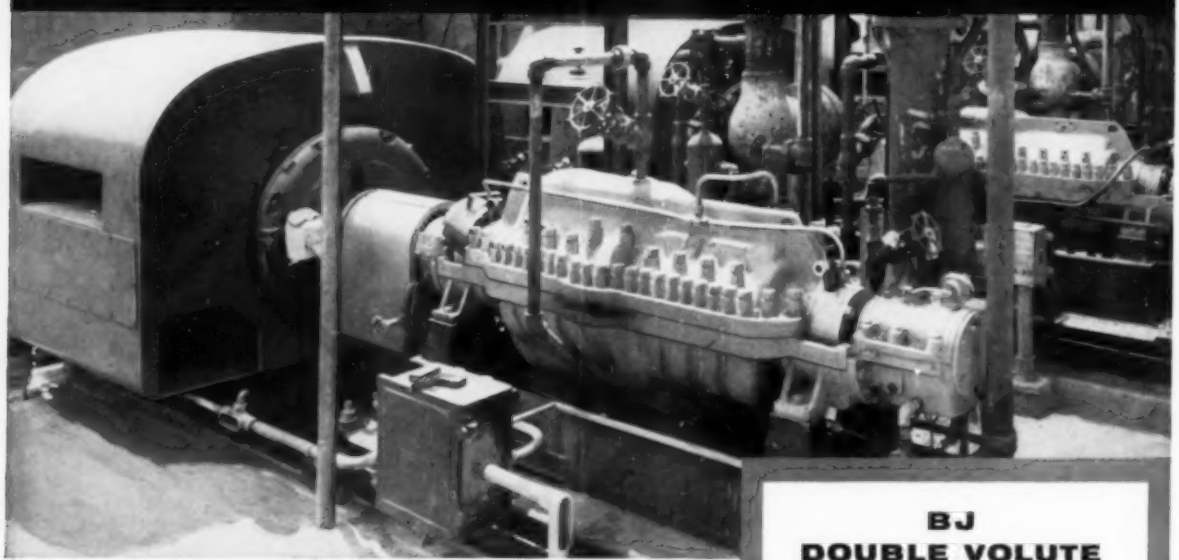
STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY of STONE & WEBSTER, INC.

New York Boston Chicago Pittsburgh Houston San Francisco Los Angeles Seattle Toronto

NEW Byron Jackson DVMX
SPLIT CASE BOILER FEED PUMP

...Engineered for Medium Size Power Plants



This new Byron Jackson DVMX split case pump gives the same trouble-free service that BJ barrel type Boiler Feed Pumps have been providing for the larger power plants in the United States for many years. This DVMX model is engineered primarily for medium-sized power plants and delivers capacities to 2200 gpm, heads to 1200 psig. and temperatures to 350° F.

Here's what you get in the new DVMX

1 Horizontally-split case, with both nozzles in the lower half of the pump case, permitting removal of the top half of the case and the complete rotating element without disturbing the piping.

2 Double volute design which assures radial balance of the pump at all capacities.

3 Impellers arranged in equally opposed groups, assuring hydraulic axial balance without resorting to the use of any auxiliary high pressure balancing devices.

4 Available with reliable BJ high pressure Mechanical Seal especially designed for boiler feed service.

5 Furnished with a spacer type coupling for easy removal of the mechanical seal.

6 The thrust and radial bearings including the self-contained oiling system are of the same reliable construction that has proven so successful over the years in the larger BJ barrel type Boiler Feed pumps. The oiling system is of ample size to supply the driver bearings if desired.

BJ DOUBLE VOLUTE

By the use of BJ Double Volute inner cases, the flow is divided into two identical fluid channels with outlets 180° apart. Equal opposing forces are created, resulting in radial balance without pressure-bending moment on the shaft.

BJ MAKES BOILER FEED HISTORY!

Byron Jackson is building the world's largest boiler feed pump. This 12,000 HP pump will deliver 6,330 gallons per minute at total head of 6,400 feet, or about 2700 pounds per square inch, at a speed of 3510 RPM.

Byron Jackson

Division of Borg-Warner Corporation
P.O. 2017, Terminal Annex, Los Angeles 54, California

BJ

This is a conference about a new plant . . .

which man is the president of the company?

The man on his feet is *not* the president of the company. He's the chief engineer.

The region on the map he's pointing to is the region where the world's finest *Bituminous Coal* is produced. This man knows that *Bituminous Coal* is the lowest cost fuel available for his company's new plant. He knows that coal burned with the right equipment will produce 10% or better more steam per dollar, and automatic handling systems will cut labor costs. He knows that Bituminous Coal is safe to store and use — and that with vast reserves and mechanized production, coal will do the most economical job.

The president of the company? He's the man taking notes. *Bituminous Coal makes sense to him!*

These offices can answer your questions about coal—Consult with them

ROANOKE
N&W Coal Traffic Dept.
Telephone 4-1451, Ext. 313, 423, 249
Roanoke, Virginia

BOSTON
833 Chamber of Commerce Building
Telephone LIberty 2-2229
Boston 10, Massachusetts

CHICAGO
Room 604, 208 South LaSalle Street
Telephone RAndolph 6-4634
Chicago 4, Illinois

CINCINNATI
908 Dixie Terminal Building
Telephone DUnbar 1-1325
Cincinnati 2, Ohio

CLEVELAND
1819 Union Commerce Building
Telephone MAin 1-7960
Cleveland 14, Ohio

DETROIT
1907 Book Building
Telephone
WOodward 1-2340 or 1-2341
Detroit 26, Michigan

ST. LOUIS
Room 1201, 1218 Olive Street
Telephone MAin 1-1180
St. Louis 3, Missouri

WINSTON-SALEM
1105 Reynolds Building
Telephone 7116
Winston-Salem 1, North Carolina

Norfolk and Western Railway

CARRIER OF FUEL SATISFACTION

NO FRILLS..

All Business

for valves, floorstands and sluice gates

CHAPMAN MOTOR UNITS

Just look at them . . . inside as well as out. You'll find that Chapman Motor Units are not only rugged in construction, *they're simple in design.* In fact, a Chapman Motor Unit has approximately *half as many parts* as any other unit.

This simplicity means better, easier operation and lower maintenance costs. It means longer life with fewer repairs.

With Chapman Motor Units your valves seat tight . . . but never too tight. Micrometer adjustment on limit switch insures exact tightness presetting. Drift is eliminated. Lash is slashed. Complete operation by low speed motors is always smooth, accurate and trouble free.

Use them in any position. Quiet, rugged stub-tooth gears require no grease or oil. Use them under the most adverse conditions. They're weatherproof, steamtight, dependable.

Installation is quick and easy. Chapman Motor Units and Floorstands are wired and ready to tie in with your leads. Just hitch them up. You're in business.

Get the whole interesting story in our newest catalog 51. Write for it, your copy, now.

The CHAPMAN VALVE Mfg. Co.
INDIAN ORCHARD, MASS.

TIMELY COMMENTS

SOUTHERN POWER AND INDUSTRY

Business Proprietors Influence Public Confidence

PUBLIC CONFIDENCE, which controls spending the half of U. S. income going into what "used to be considered luxuries," is the governing factor in maintaining high-level industrial activity, Crawford H. Greenewalt, president of the Du Pont Company, said recently when he addressed the annual diner of the Delaware State Chamber of Commerce.

"We certainly have the means, the will, and the courage to keep our industrial ship forging steadily ahead. We must realize, however, that we are dealing with a poised and delicately balanced mechanism which requires the understanding and the sypathetic attention of all those who have some responsibility for piloting our industrial enterprise.

"For it is the group decisions of business proprietors, large and small, that will have the greatest influence on the smoothness of our journey. And it is in this area . . . that something can be done to smooth out both the peaks and valleys in the years ahead.

"Should individuals or groups affecting the economy prove intemperate in demands or fail to contribute a full measure to the venture, then we are in for trouble. Anger or bitterness cannot fail to bring with them the violent and abrupt changes that could cause disaster to the economy. . . . Intemperance on the part of any group could prove disastrous.

"The businessman must be temperate in his pricing policy, in his attitude towards the customer, in his methods of competition, and in his dealings with his employees. He must avoid overbuilding and overstocking.

"Labor must avoid intemperance in seeking special advantage above and beyond its proper role. It must help, rather than discourage, the advance of our technology, for only then can it assure its own future as well as the nation's.

"Government must avoid intemperance in the establishment of burdensome regulations, in its use of the taxing authority, and in extending its activities beyond the point of essential public needs.

"Consumers must avoid intemperance in extending their desires beyond their pocketbooks and in mortgaging the future too heavily.

"Over and above all we, as individuals, must avoid intemperance in our attitude toward others and in the fulfillment of our obligations as human beings."

Instrument Control Having Profound Effect on Industry

NEW CONCEPTS of instrumentation control are having profound influence on industry, Dr. John J. Grebe, director, Basic and Nuclear Research Department, Dow Chemical Company, told the National Technical Conference on New Developments in Instrumentation for Industrial Control, sponsored by the American Institute of Electrical Engineers.

"It is just wonderful to be able to put tracer quantities into great streams of materials in process and find out that there are millions of atoms in this quantity that explode regularly, exactly in proportion to the number of them present, and burst out in an exultant shout and tell you — 'I'm here. It is I. It is little Gene — no, not Tom, it is Gene.'—and from that you can deduce all sorts of conditions such as time intervals, numbers, acidity, turbidity, concentration, level, rate of acceleration, thickness, depth, height, accumulated inventory, velocity and what-not.

"Control engineers should not think of themselves as simply men who improve the material output of factories and power sources, but as people capable by long training and association of dealing with variations in all the concepts and aspects of life, matter and energy in all natural phenomena and human endeavors.

"This is the breadth of interest that can make your life really worth living. It will make your youngsters recognize that you are facing the problems of life on all fronts. It will find you a place on the councils of men.

"The newest field of instrumentation engineering is the perfection of new technology for measuring new properties that so far have been left to analytical and research procedures. This would not only put existing processes and products under better control, but would give more courage to try to control many of the things that are still being left to chance, mob psychology, and emotions."

BORDEN *first* IN FLOOR GRATING

USES OF GRATING . . . WHERE ONLY BORDEN QUALITY WOULD DO . . .

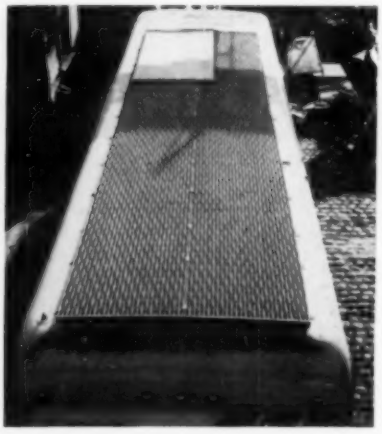
Here on this page are a few of the many new or unusual uses for grating being pioneered every day. Each is an exacting job where only standards of quality equal to BORDEN'S will do.

And remember . . . BORDEN manufactures every type grating in ferrous and non-ferrous metals.

ON THE MERRITT PARKWAY . . . The recently installed Borden Roadway Grating shown here helps solve a drainage problem. Over 80% open, these Borden gratings give years of durable, minimum-maintenance service. And remember, SPECIFY BORDEN and you specify the best.

Only the finest precision manufacturing would satisfy the architect who designed this door. BORDEN is recognized as a leader in quality, custom-manufactured gratings.

Television relay stations and radar stations that gird our continent have adopted grating as standard outside platform material. It will not collect snow as most other platforms will.



Wherever this Color Television truck goes, whatever the assignment of the reporters who must mount its roof, Borden riveted *serra-crimp* grating will mean surerfooting —even in ice or snow.

BORDEN METAL PRODUCTS CO.

Gentlemen:

Please send me BORDEN Catalog

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TITLE .....

COMPANY NAME .....

ST. AND NO .....

CITY AND STATE .....

See our catalog in Sweets

Write for complete information on BORDEN All/Weld, Pressure Locked, and Riveted Floor Gratings in this FREE 8-page catalog

BORDEN METAL PRODUCTS CO.

853 GREEN LANE ELizabeth 2-6410 ELIZABETH, N. J.

SOUTHERN PLANT—LEEDS, ALA. — MAIN PLANT—UNION, N. J.

INDUSTRY SPEAKS

A FORUM ON PROSPECTS FOR ATOMIC ENERGY IN THE SOUTH was held in Atlanta, April 17-18. After the meeting, many participants went on to Oak Ridge, Tennessee to inspect facilities of Oak Ridge National Laboratory.

The two-day forum in Atlanta presented many papers of both technical and economic nature. It was sponsored by: Atomic Industrial Forum, Inc., The First National Bank of Atlanta, Oak Ridge Institute of Nuclear Studies, Oak Ridge National Laboratory, Southern Association of Science and Industry, and Southern Research Institute.

The paper abstracted here was presented by **H. J. SCHOLZ, President, Southern Services, Inc.,** Birmingham, Ala. The company headed by Mr. Scholz is the mutual service organization of the Southern Company utility system. Four operating utilities in Alabama, Georgia, Florida and Mississippi comprise the Southern Company.

Progress Toward Atomic Power in the Southeast

By H. J. SCHOLZ

I DO NOT SUBSCRIBE to the theory that we will all wake up some morning to find the world completely revolutionized overnight through the widespread utilization of atomic energy. On the other hand I most assuredly do not agree with those who regard the benefits of nuclear energy as something which will be enjoyed, if at all, only by future generations. The day of atomic energy has already dawned, let there be no question about that.

Electric power production through atomic processes is an actuality today and within five years large-scale installations will be in operation. Dwindling supplies of conventional fuels will become increasingly valuable for chemical purposes rather than for power production in future years.

Let us remember that it has been the history of technical improvements in this country that progress sometimes tends to snowball, with the result that early forecasts of rate of development prove to be too conservative. Atomic energy may very well follow this pattern.

Review of Developments

In discussing progress in nuclear power it is appropriate that some historical background, a review of recent developments, as well as a forecast of the future, be covered. In 1905 Dr. Albert Einstein introduced the theory of relativity, in which he proclaimed the equivalence of mass and energy. But it was not until 1939 that nuclear fission was accomplished. It has been less than fourteen years since the first reactor was built and the first controlled chain reaction demonstrated. The atomic bombing of Hiroshima and Nagasaki was in 1945. Little work was done on peaceful power potentialities until 1948 and then only in national laboratories.

Nuclear power is of great interest to the electric power industry because one pound of any material if converted into energy would yield more than 11 billion kilowatthours. This is nearly twice the amount of energy sold by Georgia Power Company last year.

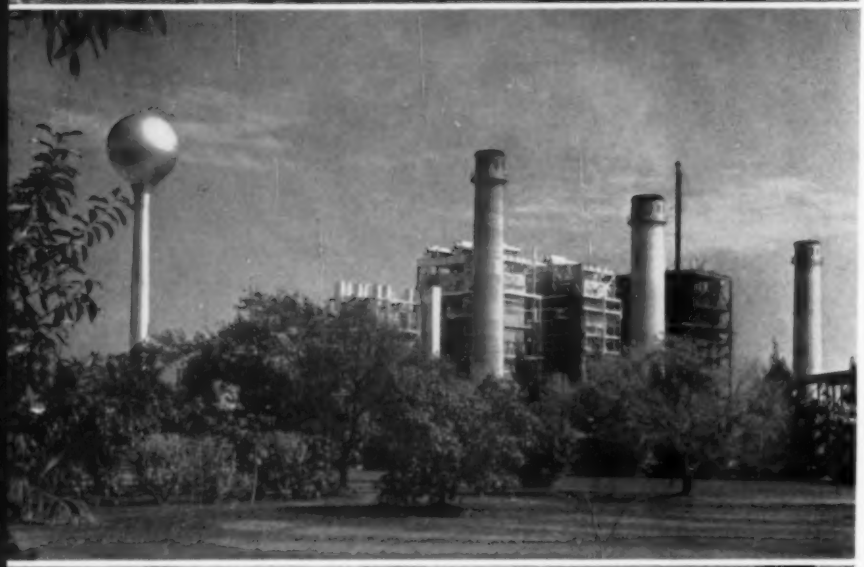
So far we have learned to tap the nuclear energy only by means of the fission process, which yields in the form of heat only one-tenth of one percent of the potential atomic energy. Yet this yield is 2,500,000 times greater than that obtained from coal through conventional means. Thus far, only thorium, uranium 235 and plutonium have been found to be fissionable.

Private Industry

It was not until late in 1950 that private industry could direct any real effort toward the investigation of the peaceful utilization of heat from nuclear fission. One of the early steps toward participation by private enterprise was the agreement entered into late in 1950 by Dow Chemical Company, Detroit Edison Company and the Atomic Energy Commission which permitted Dow-Detroit to undertake a complete study of available information to determine whether the utilization of nuclear fuel for power generation would be feasible.

The number of study teams exploring this field has steadily increased, all carrying on their own development efforts at their own expense under agreements with AEC. Manufacturers of electric equipment, chemical firms, electric pow-

(*Continued on Page* 107)



Factors in

KEEPING PACE with Florida's rapid increase in population, Florida Power & Light Company has tripled its generating capacity since the end of World War II. Since the number of both their residential and industrial customers is increasing at the same rapid rate, they are preparing plans to triple their capacity again during the next 10 years.

One of the problems in adding additional capacity at such a fast rate is the selection of the best instrumentation. This is no minor task to be treated lightly. The proper instruments can spell real dollar savings in reduced capital investment, lower operating costs, increased over-all efficiency, greater safety, and longer equipment life.

Although a blessing in disguise, a complicating factor in the selection of instruments is the rapid rate at which new instruments are being introduced to the market. The combination of the expansion of generating capacity and the increase in new instrumentation poses quite a problem to Florida Power & Light's busy engineers. They simply do not have enough time to consider, evaluate, re-evaluate and then reconsider in-

The control room, nerve center of the Riviera plant near West Palm Beach, was recently enlarged when a new generator was added. The interconnected F. P. & L. system now has a capability of 742,000 kw.

Instruments keep precise check on the operation of Florida Power & Light Company's Cutler plant. Five generators are in use, a sixth nearing completion. The new 140,000 kw unit is the state's largest.

From his office in Tampa, Honeywell representative W. L. Bolton has just arrived at Cutler for consultation with C. L. Wolff (right), F. P. & L. production supervisor.

Selecting Instruments for Utilities

By E. H. O'NEAL
Florida Power & Light Company

strument selections. Instead, they must be able to make their selections quickly and they must be right.

Engineering Assistance

To help them arrive at the correct decisions, F.P.&L. has retained (for the plants now being constructed) the engineering assistance of Ebasco Services, Inc. They will act in the capacity of designers, consultants and purchasing agents. F.P.&L. engineers rely heavily on the consultants' instrument recommendations since these recommendations are based on broad power generation experience. However, they do reserve the right to introduce one factor — their own operating experience — which can outweigh the consulting engineers' recommendations.

When they select instruments for a new unit, F.P.&L. engineers initially stipulate general specifications; i.e. whether turbine and boiler boards are to be combined or separate; whether graphic or conventional panels are to be used, and what types of instruments are to be used if there is any special reason for specifying particular instruments.

The consultants' project engineers follow through and recommend the instruments which they feel will best meet the specifications. It is then up to Florida Power & Light to either accept these recommendations or substitute other instruments.

The consulting engineers' recommendations are rarely accepted without careful consideration in the light of the company's own evaluation of available instruments. No formal check list is used to evaluate instrument qualifications, but each instrument is considered with regard to how it stacks up in four general categories: (1) performance history; (2) costs; (3) manufacturer's reputation, and (4) operational and constructional features.

Operating Experience

In evaluating instruments with respect to performance history, the most important factor is the actual experience F.P.&L. operators have had with similar instruments on other units. These operators are the men who put theory into practice and who can tell whether or not the instruments measure up to the manufacturer's claims. These men know if the instruments are suitable for the jobs for which they were intended, and how dependable they were from the first day of service.

Operating experiences with instruments already installed influence instrument purchases from another angle, too. There is a natural conservative tendency to stick to instruments that have operated satisfactorily in the past and with which the operators are most familiar. Generally, if instruments that have not been in F.P.&L. stations heretofore are to be used, they must, almost invariably, be intended for a special purpose.

The engineers do consider, however, the general acceptance of an instrument by other utilities, and thereby profit by the experience of others. Most manufacturers are quite happy to supply lists of other utilities using the same instrument. It is necessary to check only a few utilities to learn how the instrument performs in service.

Total Costs

To determine whether an instrument is economically justified, more than just its purchase price must be considered. All other factors being equal, the utility purchases comparable instruments on the basis of lowest cost, but includes in the figures installation costs and the future cost of replacement parts.

The cost of duplicate stocks of replacement parts is probably the most valid argument for standardizing on one manufacturer if the station has to maintain its own inventory of spare parts. An increase in the number of instruments of the same make does not necessarily mean that the inventory of parts has to be increased accordingly. Occasionally, this is a factor, especially if the manufacturer has not simplified and standardized his line. If the instrument has an excellent performance history and if the manufacturer's local representative keeps a good stock of spare parts, then the cost of additional inventory need not be a factor.

Like all central station equipment, instruments must satisfy the requirements for a long-term investment. Low cost instruments with short service life are no saving. This principle is already well accepted by utilities as evidenced by the general practice of central stations to weld thermocouple wells into place instead of screwing them into bushings.

Quality must also be considered when evaluating costs. It is generally worth paying a premium for instruments where the premium represents increased manufacturing costs for vital improvements. For example, if a manufacturer polishes a moving part to achieve greater accuracy and the increased

THE AUTHOR has a BME degree from the University of Florida. After one and a half years with General Electric Company, he joined Florida Power & Light Company with whom he has been associated for the past five years. This article is based on his experiences in Florida Power & Light's General Engineering Department where his work includes designing power plants, ordering instruments and maintaining records on the efficiency and serviceability of the instruments.

Service men should have good personalities and also be skilled at instrumentation. Above, Honeywell service man Hugh McManus (right) was called to advise F. P. & L. electrician during accuracy check of a new Electronic recorder.

accuracy can aid the operation of the station, then the cost of polishing the part represents a justifiable increase over the costs of other instruments that do not have the part polished. If on the other hand, the premium is the result of decorative chrome trim or poor design represented by oversized and overpowered components, then no premium is justified.

Other items that must be considered are the costs, interchangeability, and ease of filing charts. The chart costs often offset low initial instrument cost.

Manufacturer's Service

As mentioned above, the manufacturer's local facilities are considered. Not only is it important to have a reliable and ready source of replacement parts, but it is a real asset to have available good service men on call. At Florida Power & Light, a great deal of value is placed on the abilities of the manufacturer's local service men and field engineers. It is important that the manufacturer's local representative know both instrumentation and the power industry. All salesmen are willing to give free advice, but it is important to be able to depend on this advice.

It is important that the manufacturer's local representative exhibit an ability to cooperate with both the operating and engineering personnel. In other words, they must have all-around approval and not be friendly with a few and at loggerheads with others. Here, personalities are factors but justifiably so, for if an instrument is to be of value, it must be accepted by the operating personnel. If an operator does not think highly of a manufacturer's representative, he is likely to carry his attitude over to the new instrument and will be inclined to place little confidence in it.

In addition, F.P.&I. must consider the facilities that the manufacturer has for training company maintenance men on new instruments. It is costly for maintenance men to learn by experience, and the training they receive in manufacturers' schools and classes can be of real value. Occasionally, some of the utility's engineers may require some concentrated instruction in a particular type of instrumentation and, therefore, the ability of the manufacturer to instruct engineers in application instrumentation is also considered.

Even the manufacturer's literature is a factor in instrument evaluation. When spare parts or modifications are required, they should be fully explained in the literature so that orders can be placed without any misunderstanding as to what is desired or needed. Instruction manuals are also important. They must be written in a language that is understandable to pipefitters and electricians, and they must be clear enough so that an engineer does not have to be on the job to interpret and analyze them.

Finally, in evaluating the manufacturer's reputation, F.P.&L. looks for responsibility and experience. Experience was covered in the discussion on instrument performance. Responsibility means that the instrument manufacturing companies must be able to back up their claims.

The manufacturer's reputation for meeting delivery dates is also considered. With a rapid expansion program, delivery dates are important and must fit into the construction schedule. If the construction schedule is tight, long delivery dates should be accepted only if the manufacturer has an excellent reputation for meeting his delivery schedules. Time lost in construction schedules can easily cost more than any price differential that may exist between comparable competitive instruments.

Specifications

In evaluating instruments with respect to operational and constructional features, there is a possibility of being unneseccarily strict in requirements. When this happens, the instrument manufacturer may have to increase his prices in order to meet the specs. Where the specs require special instrumentation which means a premium, it should definitely be determined that the special instruments are necessary. This is not always easy.

Many instruments serve no other purpose than to warn the operators when conditions change and in-

dicate that something has gone wrong. The natural tendency is to correct the conditions as quickly as possible; therefore, the operators want to be altered quickly. For this reason operators want to specifiy the fastest responding instruments available. However, the fast instruments are more expensive and the added cost may not be justified. The speed of response of an instrument must be considered in relation to the time it takes an operator to respond to an alarm and the time that it takes equipment to absorb corrective action.

In the instruments themselves, simplicity in design and ease of servicing are important. Building-block type of construction is definitely a plus value since it enables service men to pull out a part or component that may be giving trouble and replace it with a spare. This means that the entire instrument does not have to be taken off the board and removed to the shop for repair work.

Readability is another factor to be considered. Instruments should have clear scales, easy-to-read markings, freedom from shadows, and prominent pointers. This is especially true of indicators since they are usually observed from distances and good clear scales are necessary for accurate readings.

Florida Power & Light Co. weighs chart costs when purchasing instruments. Storekeeper Bill Conroy stacks up a year's supply, obtained at lower, large quantity cost.

Florida Power & Light Co. urges manufacturers to supply up-to-date catalogs and literature for power plants and engineering offices. Here Hans Samann (right), chief electrician at Cutler, orders equipment.

Preferably instruments should be easy to calibrate on the job. It is a definite advantage if an instrument does not have to be taken out of service to be calibrated.

Size and type of mounting are also important. If instruments are to be panel mounted they should meet all other requirements and yet use a minimum of panel space. Generally though, it is not wise to conserve panel space by sacrificing the size of indicator scales. Therefore, it is necessary to consider instruments in accordance with the relationship between scale size and panel space and choose those with the longest scales but which occupy the smallest space.

Finally, the instruments must be rugged—especially the primary elements. Part of this is embodied in the requirement for long life. But the concept of ruggedness goes beyond that. If instruments are to be used by operating personnel, they cannot be delicate laboratory paraphernalia that must be treated with kid gloves. Unfortunately, this is the one aspect that can stand improvement on many instruments, especially the newer ones, such as colorimeters and others recently developed for special applications.

List Saves Time

One time saver that helps in the selection of instruments is a list of acceptable instrument specifications. These specifications contain the options usually chosen for one reason or another. It is merely necessary for the consultant's project engineers to go through a mimeographed copy of the specifications and check off the instruments and options needed for the unit being designed. These specifications were prepared jointly by the consulting engineers and F.P.&L. engineering staff.

The specifications not only save time but they save much confusion and avoid the possibility of ordering wrong instruments through misunderstandings. It is only necessary to revise the specifications periodically as new instruments are developed and found to be acceptable after being evaluated as described in this article.

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Nuclear Energy Developments

By JOHN F. LEE

Professor of Mechanical Engineering
North Carolina State College

THE ATOM is very much in the news these days in a flurry of activity which appears to be a rehearsal for big things to come in the near future. There seems to be a great deal of impatience with progress made in this country in the development of peaceful uses of nuclear energy. This impatience is paced by a certain amount of anxiety on the part of producers of conventional fuels. Industrial leaders, as well as state and local governments, are feverishly trying to get in on the ground floor in the new nuclear energy industry. Users of conventional fuels are viewing new plants and plant expansion in terms of the impact of nuclear energy on their competitive position.

The use of nuclear power for land, sea and air transport is receiving studied attention and has focused considerable interest on military developments in these fields. The prospects of a lush export market in all kinds of materials, components, instruments and equipment related to atomic energy has stimulated a lively interest in foreign activity in nuclear energy. As nuclear energy becomes a more commonplace part of the industrial scene local governments are faced with the need for safety and health regulations. It is indeed difficult to find a region of the country or an industrial activity which does not have a vital interest in the atom. To partially satisfy this interest a brief summary of the latest developments is given here.

Effect on Coal and Oil

There has been some concern among producers of oil and coal as to the impact of nuclear fuels on their competitive position. This concern was allayed by two authoritative sources recently. Speaking at the National Credit Conference of the American Bankers Association held in Chicago on January 17, Robert E. Wilson, chairman of the board of Standard Oil Company (Indiana), had this to say. Although the development of nuclear power is "highly important to the nation and the world, the impact on our (oil) industry will be negligible over the next twenty or twenty-five years." Mr. Wilson supported his prediction by pointing out that there is little likelihood that atomic energy will be soon introduced into the transportation field which is the "oil industry's principal market."

The Citizens' Panel on Atomic Energy, in its recent report, asserted that the impact of nuclear power would be so gradual in an expanding economy that the coal, oil and gas industries would suffer no serious damage.

Hazard Insurance

Seventy capital stock casualty insurance companies have formed a syndicate to underwrite radiation hazards on industrial nuclear reactors. This is the first time this form of insurance protection has been made available, and several other syndicates are expected to follow suit. It is reported that a block of mutual insurance companies are preparing to issue similar insurance in the very near future. All this means that insurance will be available before the first atomic power plants go into operation.

The proposed coverage will include "third-parties" only. That is, coverage extends to bodily injury and damage to property of others (excepting that of the reactor owner and operator) if the damage is caused by radiation. The syndicate is ready to issue insurance to the extent of $50,000,000 for each of the atomic power projects announced thus far. Utility executives welcomed the insurance and expressed the general feeling that atomic power risks had been greatly exaggerated in view of the Government's excellent safety records. The concensus of utility, scientific and insurance experts is that the danger of explosions in nuclear power plants is very remote.

Thorium Available

The Atomic Energy Commission recently announced that thorium, a nuclear fuel, is now available in limited quantities for purchase by private industry. The price is about $19.50 per pound as compared with a price of $11,350 per pound for uranium-235. Thorium can be used as a fuel in so-called fast reactors which utilize fast neutrons for fission. Alternatively, in moderated reactors (a moderator slows down the fast neutrons released in fission) the slower neutrons can be used to transmute thorium into the costlier uranium-233 in a process called "breeding."

Agriculture

Congress has been advised of the impact of nuclear energy on agriculture and food processing industries. Recent laboratory investigations have shown that atomic energy can be used to produce what are called "tailor-made" plants. There is a good prospect that plants can be developed which will be better adjusted to climatic conditions and can combat drought, excessive rainfall, deficient soils, disease, and even late and early frosts. A variety of wheat which has a high yield and is resistant to rust, a devastating disease, has already been produced through radiation. Radiation has also produced a variety of rice which can resist the high winds which sweep across the Texas plains to raise havoc with the rice crop.

Radiation is not yet in commercial use for preservation of foods but it is certain to have a sharp impact in the foreseeable future on food processing, packaging, merchandising, meat packing, and re-

frigeration and transportation of food.

Nuclear Transport

The Maritime Commission has received the last of several sealed proposals for the construction of a marine nuclear power plant. The nuclear power plant will have a capacity of 22,000 shaft horsepower and will be placed in a 38,000-ton tanker capable of a speed of 16½ knots. President Eisenhower has asked Congress for an appropriation of $22,500,000 to build the ship with a supplementary request of $13,000,000. This is the famous "Peace Ship" widely reported in the newspapers. Aside from the value of the project in foreign relations, the lessons learned from its construction and operation are expected to lead the way to a new era in sea transport.

The Navy has submitted requests to Congress for funds to build a nuclear powered missile-launching cruiser, six atomic submarines and to plan a nuclear power plant for an aircraft carrier of the Forrestal class.

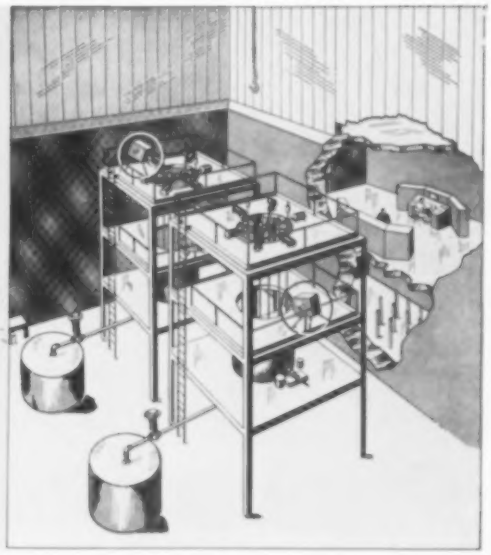
Foreign Plans

Although the splitting of the atom is no longer news, it is news when the atom combines the European nations into a federated group. The critical need for atomic power in Europe, which is faced with a dwindling supply of conventional fuels, has led to a joint resolution of six nations to pool their atomic resources. The economic growth of Europe, and indeed its industrial stability, is inextricably tied up with the future of atomic energy. Nuclear energy industries in the United States estimates the potential European market for power reactors and associated components at about $27,000,000,000 when the atomic energy programs get underway.

Apparently the Russians are also aware of these market possibilities and are pushing a new five-year plan which calls for a capacity of 2,000,000 to 2,500,000 kw by 1960. This should be compared with 689,000 kw of capacity for the United States by 1960. The British expect to have plants totalling 1,500,000 to 2,000,000 kw of capacity in operation by 1965. These figures are the basis for a great deal of government and industrial fears in this country that we are letting our atomic energy leadership slip through our fingers. It is generally felt that the Soviet is making a strong bid for leadership in the atomic energy field, not only for its propaganda value, but in an effort to corner a large segment of the world market. As a result there is a considerable effort underway in Washington to ease many restrictive measures on the export of technical information, nuclear materials, and nuclear equipment as a means of sustaining our leadership.

One American firm, American and Foreign Power Company, Inc., has made the first firm commitment to build an atomic power plant outside the United States. Henry B. Sargent, president of the company, has no illusions as to the difficulties to be overcome in clarifying the various procedures and requirements imposed by government regulation here. Bilateral agreements between the foreign countries and the United States will have to be worked out first. The company, a subsidiary of Ebasco Services, Inc., plans to build four atomic power plants of 10,000 kw capacity each in three Latin-American countries. It is reported that one of the plants will be built near Mexico City, and the other three are likely to be built in Brazil.

Battelle Institute has just completed a reactor development (critical assembly) laboratory for use in full-scale model studies of nuclear reactor cores for power production. The reactor room in the sketch of Battelle Institute's newly completed reactor development laboratory shows two "critical assembly" mock-ups for experiments to determine how final power reactor cores should be designed.



Case histories from two Southern industrial plants . . .

How to Stop Condensate Line Corrosion

Fig. 1. Pitting near water-line in boiler accelerated by oxygen

By HARRY M. SPRING, JR.

EXCAVATION and replacement of corroded, leaky condensate piping may cost several thousand dollars in a single heating installation. Nationwide, the cost is tremendous! In some installations, several miles of piping may be involved. The economic importance of this problem and the tremendous waste of steel surely warrants firmly planned preventive maintenance to reduce this great waste.

Internal corrosion is the basic cause of the deterioration. Much has been learned about this during the past few years, so let's look into the probable causes for this attack and the corrective steps that should be taken.

Usually, the causes for this waste go right back to the condition of the boiler water. Faults at this source are often the cause of contamination in the steam, which in turn renders its condensate very corrosive to steel piping.

Tests and Control

Balanced and controlled boiler water treatment resulting from years of research and technological experience are a large factor in the solving of the problem. It is emphasized that cure-all compounds are not the answer. Control tests of boiler water and condensate at least daily, along with adjustments to meet variations are essential for successful results.

The variations include steam load changes, any changes in source of water supply, seasons of rain or drought, accidental contamination of process steam, etc. Obviously, no fixed treatment without control testing for proper dosages can combat conditions that may change daily.

It is well known that oxygen and carbon dioxide in the condensate are the usual causes for corrosive attack. There are same relatively new methods of approaching the problem and sometimes there are mechanical factors that should be considered. It is the intent of this article to describe both.

Oxygen and CO_2

Oxygen removal by a deaerating heater is the recommended practice in modern boiler plants. Top efficiency of a good deaerator may reduce oxygen content of the feedwater to practically zero. To supplement this, feed of sodium sulphite to maintain a residual concentration of 5 to 15 ppm in the boiler water is usually practiced to scavenge last traces of oxygen. Carefully controlled feed of hydrazine for this purpose is a recent procedure.

The oxygen promotes pitting and corrosion in the boilers, Figure 1, and it greatly assists CO_2 in attacking condensate piping as both of these offenders are carried along in the steam.

While CO_2 absorption from air is a source of contamination, well-water make-up and some internal treatments are sometimes greater offenders. Improper use of soda ash and breakdown of carbonates or bicarbonates in a boiler may lead to decomposition of these materials and release of a large amount of CO_2.

A deaerator may not be quite so efficient in removal of CO_2 as in removal of oxygen. This gas passing along in the steam forms carbonic acid as the steam condenses. The acid is very corrosive to steel, and assisted by any oxygen, it will channel a penetrating groove along the bottom of the piping. Failure of the piping has occurred in a year or less.

In theory, the wasting of metal suggests an electro-chemical action just as in a storage battery. As the acidity increases, there is an accompanying increase in potential between dissimilar metals and an increase in current flow. As there is certainly dissimilarity in stray elements in the steel, we have a galvanic cell action of steel or its

alloys, dissolving into the electrolytic solution to "plate out" on other areas and leave pits and loss of metal behind.

Feed of a proper amine to the boiler water usually renders the steam capable of producing condensate practically free of this corrosive property.

Iron Oxides

A secondary but important result of corrosion in condensate piping is high iron content in the return water to the boilers. This is especially troublesome in high capacity boilers operating at above the 400 psig range.

The incoming corrosion products (iron oxides) adhere to high temperature heating surfaces and interrupt the flow of heat. It has been found often that copper is contained in the adherent deposits, suggesting a disolution of copper from brass fittings in the feedwater system or from condenser tubes. Severe wasting of metal beneath such deposits may take place. It is believed that here again, an electro-chemical action is responsible.

Should the reader refer to a standard table of the electromotive series of metallic elements, don't be confused by the relative position of copper. These tables are for standard conditions of ionization and temperature, the latter often at 25 C. For the extreme conditions described, many elements reverse their position in the table.

The amount of iron in the condensate may be determined quantitatively, but for all practical purposes it is sufficient to collect a sample of condensate in a clear glass container and compare it visually with a sample of distilled water in another clear glass container. Note the turbidity, or particles of rust floating in the condensate. The reddish color is a fair guide in distinguishing this from other suspended solids.

Case History No. 1

Figure 2 shows the basic, flow diagram of a system in which serious corrosion problems developed in a comparatively new steam plant. Condensate piping wasted through in a short time. Pitting in the boilers was approaching the condition shown in Figure 1.

Steam from the boilers was supplied at 250 psig through pressure reducing valves to several buildings. Steam at the higher pressure was used for power generation, laundry and cooking purposes. Of particular interest is the supply of reduced pressure make-up steam to the deaerating heater during periods of low power demand. Water softeners were installed at the plant and there was no internal treatment of the boiler water.

A detailed survey of the entire installation was made to determine the cause and remedy for the costly and rapid corrosion. The following is a condensation from the investigation report.

The first "suspect" was the deaerator, as it obviously was not functioning properly. Data was gathered on the operation of this unit to develop a time-temperature curve. The curve showed cycling of deaeration during periods when turbine exhaust was insufficient to maintain necessary pressure in the deaerator. The cycling is explained as follows:

The pressure reducing valve would open. Then, in two minutes there would be sufficient pressure in the deaerator and on the downstream side of the PRV station to close the valve. The temperature of the water to the boiler feed pump would then be 224 F. Following this cycle, the PRV station would remain closed for seven minutes until make-up water had cooled the feedwater temperature to 120 F, and when condensing, steam would drop the pressure in the deaerator enough to again open the PRV station.

Efficiency of oxygen removal was less than 30%. While correction of this condition was not the

(Continued on Page 106)

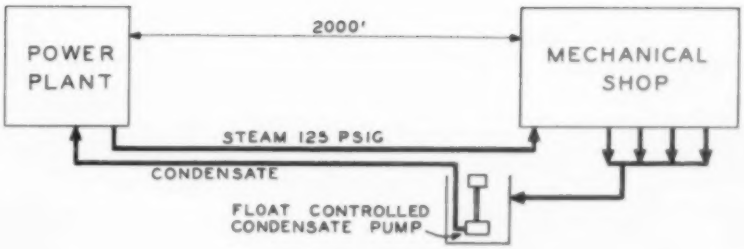
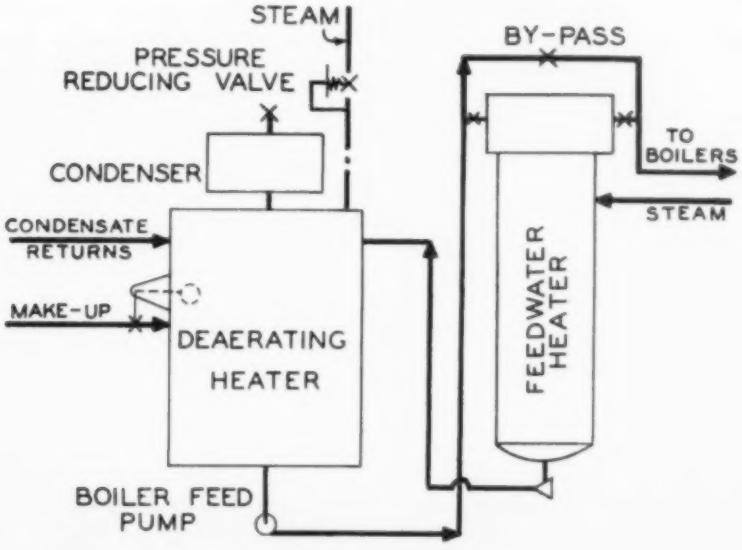


Fig. 3. Basic flow diagram Case No. 2

Fig. 2. Basic flow diagram Case No. 1



Neat storage of diverse shapes on pallets is achieved through custom-designed storage racks in Tampa Electric's huge new Operations Center, Tampa, Fla. Roof encloses about three acres of space. There are 17 more paved acres outside.

Room for Storage and Loading

Tampa Electric's New Operations Center

QUALITY AND DESIGN of storage racks vary surprisingly. There is a different kind of rack for almost every line of inventory. One man's streamlined storage system may be another man's bottleneck. Properly designed racks increase storage space, reduce handling costs, greatly decrease damage to merchandise and equipment, let shipments move on time, and ease inventory control. They make for orderly housekeeping.

The racks in Tampa Electric's neat new Operations Center in Tampa, Florida — some three acres under one roof and 17 paved acres outside—were designed with these goals in mind.

Maintenance and construction equipment is handled here for the most part. The storage department stocks maintenance supplies for practically every piece of equipment maintained throughout the vast service area — roughly 1700 square miles on the West Coast of Florida. About a million and a third dollars worth of material is here at all times.

Most of the racks are the general pallet type. Made and installed by Artco Corp., Flourtown, Pa., they hold everything that can be stored effectively on a flat 42 by 48 in. pallet surface. Cable reels are kept separately in stack-type reel racks. The utility fabricated its own pipe storage racks.

Back-to-back pallet racks had been specified to save space. Artco engineers found, however, that column locations would not accommodate such an arrangement. Two single lines of racks, separated by a single aisle, were the answer. Still the cardinal rule was observed: use every available inch of storage capacity but allow quick access to each item.

Columns have an unhappy way of cropping up in the wrong places when it comes to installing racks. It's true in too many warehouses. So the racks have to be fitted around the columns. Thousands of precious cubic feet are lost in many plants by rack designs too rigid to fit closely around and between such obstacles.

Stacking heights also must be computed. Limits are set either by ceiling clearances or the effective

stacking heights of lift trucks. (Ceiling and clearance in TE's warehouse is 15 ft.) If only two vertical feet are lost in a 200 by 300 foot building, for example, 120,000 cu ft of expensive storage space is frittered away.

The pallet racks selected by the utility offered a slight price advantage over other systems, but were chosen mainly because of simplicity of construction and ease of assembly.

Structural engineering of primary rack elements must provide strength enough to carry the load. Yet not use unnecessary steel that hikes costs. Number of loading as well as weight of merchandise should be considered. Shocks from repeated dropping of heavy loads can give racks a good case of battle fatigue. Dynamic loading calls for greater strength than static loading of dead storage.

More steel isn't necessarily the way to increase structural strength, either. Back-to-back pallet racks using common end frames support each other and increase rigidity. Stringers, the horizontal members that parallel the aisles, vary from two to six inches in width, depending on the distances between vertical supports or end frames. Stringers can be made stronger by horizontal stiffening members or runners. Sometimes the runners can double as pallet supports.

Rack makers don't usually care to get involved in installation — though they make arrangements if the customer asks. Warehousemen generally do it themselves. A great deal then obviously depends on how the rack elements are furnished and what remains to be done to put them together.

All of the "Rak-A-Tier" systems come with welded platforms and welded end frames. When they arrive on location, the units are readily bolted into continuous rigid racks of the prescribed length, depth, height. Careful design ahead of time makes final assembly easy.

Aisle widths vary from one warehouse to the next. And sometimes, in ill-designed distributive plants, from one aisle to the next. Aisles in TE's well-planned depot are 78 in. wide. Fourteen of the 300 men who work here move or direct flow of goods in or out of place via these aisles. The rest are maintenance workers and repairmen.

Lift trucks buzz up and down the narrow aisles in TE's vast storage department. There is one Yale Warehouser straddle truck (see photo), and two Clark Carloaders that work outdoors most of the time. Four-wheel hand trucks are used for picking up material from the storage bins and racks and unloading maintenance equipment returned from each day's route in the utility's repair and service trucks. The center is supplied by truck and rail.

Another warehousing axiom was observed by Tampa Electric: they allowed an absolute minimum of 3 ft and preferably 6 ft clearance on each side of every bay.

Straddle-type lift truck places palletized maintenance equipment on second tier of storage racks in Tampa Electric's Operations Center, Tampa, Fla. "Rak-A-Tier" steel racks allow direct access to items arranged in three tiers. Man on rolling ladder, rear, checks inventory.

How to Install Piston Rings Correctly

By A. T. LOHKAMP, Engineer
Pasco Packing Company
Dade City, Florida

WHEN REPLACING piston rings in ammonia compressors, always rake the edges of the ring very lightly with a file before installing. By removing the rough edges before installing, the rings will break in better and cause a great deal less wear on the smooth, polished interior surface of the cylinder.

Always check the ring tension before installing new rings to be sure that the tension is not in excess of manufacturers recommendations. To do this, clamp the piston ring in a vice with the cut horizontal to the floor. Tie a string or fine wire just below the cut, run the string (or wire) back under the ring, around and over the top so that the free end hangs past the cut. With an accurate spring scales fastened to the free end of the string, pull down until the ring gap is nearly closed. The scale reading will then indicate the ring tension.

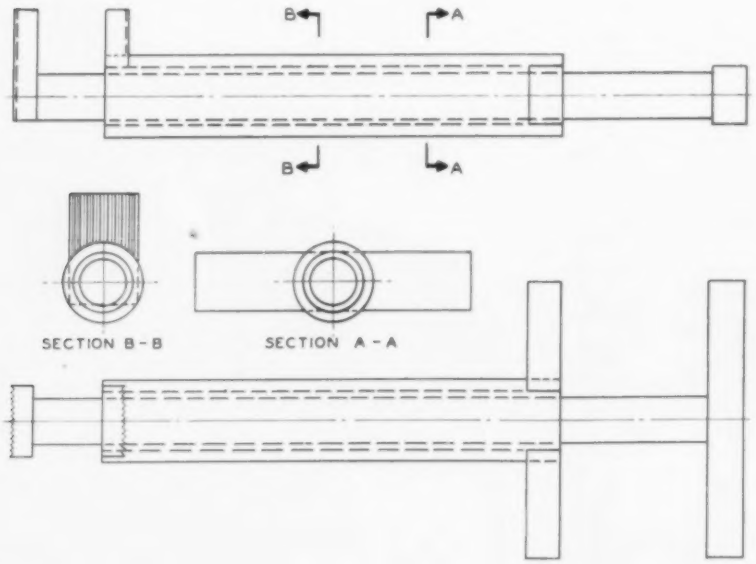
Piston rings with too much tension tend to wear cylinder walls and rings very rapidly necessitating frequent replacement. Too many replacements of rings of too great tension will call for cylinder replacement.

A cheap and handy ring expander for use in replacement or removal of piston rings can be made by using a piece of small diameter pipe, with a bolt through the center of the pipe and about 3" longer than the pipe. Small projections of about ½"H x ¾"W x ¼" thick, one welded to the pipe and the other welded to the bolt at one end serve as dogs to engage the ends of the piston ring. A bar welded to the opposite end of the bolt and two ears welded to the pipe serve as handles. The bar handle for the bolt can be about ⅜" thick x 3"L x ⅝"W and the ears that weld on either side of the pipe should be the same size and length less the O.D. of the pipe. These handles should set at right angles to the dogs. The dogs have shallow notches to prevent slipping off the ends of the piston rings.

When expanding rings with a ring expander be careful not to expand more than necessary. Greater expansion than necessary may lead to piston ring breakage. Piston rings should be warmed before placing on the piston if the weather is cold. Rings at 100 F should expand enough to allow easy placement without breaking.

Hack saw bladges with the teeth ground off can be used to replace piston rings if an expander is not available or can not be made. Use not less than three, preferably four hack saw blades, grind the teeth off so that the sides of the blades are smooth, place ring on top of the piston with the hack saw blades down the side of the piston inside the piston ring. The smooth blades will then serve to guide the new ring over the first ring grooves into the desired position. This usually requires two men. A ring expander can be manipulated easily with one hand.

When ordering piston rings from any source other than the equipment manufacturer, the following information should always be supplied: make, model, and types of machine, width of old ring, bore and stroke, and ring tension. It is frequently an advantage to both the ring manufacturer and the purchaser to state the depth of the piston ring groove in the piston. Some machines may have shallow ring slots that a standard thickness of ring would not fit.



Ring expander design.

Checking ring tension.

Process CO_2 and Steam Needs Met on Low Grade Western Coal

with REPUBLIC *Automatic* COMBUSTION CONTROLS

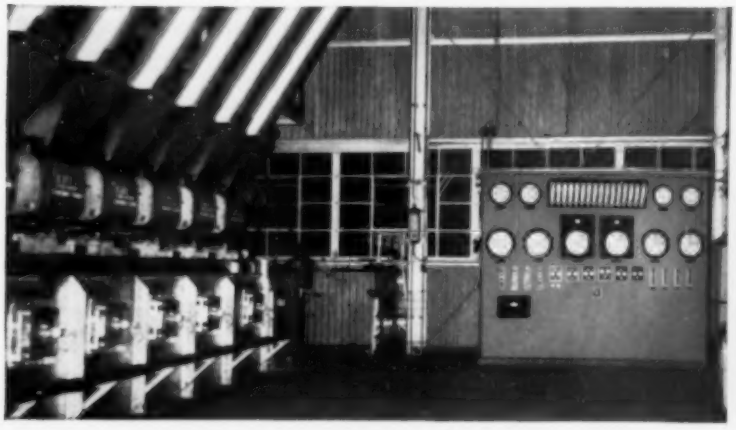
Utah-Idaho Sugar Company's new $7,000,000 sugar beet factory at Moses Lake, Washington, makes over 75,000,000 lbs. sugar each year, and uses a lot of steam and CO_2 to do it. Republic automatic combustion controls meet these multiple needs efficiently.

High CO_2 in the flue gas is an important indication of combustion efficiency, but it has added importance at the new Moses Lake plant of the Utah - Idaho Sugar Co. High CO_2 production must be maintained to assure adequate supplies of the gas for processes, and the concentration of CO_2 in the flue gas is important to the cost of its extraction.

Republic Automatic Combustion Controls keep the CO_2 at a high 12-13%, despite the low-grade western coal being burned.

The plant's spreader-stoker-fired 250,000 lb/hr boiler must be regulated to meet the CO_2 quantity and concentration requirements while furnishing the needed process steam at top efficiency. Plant operators report that the Republic controls meet these multiple requirements even during ash removal, soot blowing, and fire cleaning—without disturbing the fuel-air ratio and *while on fully-automatic control.*

Speed-controlled forced and induced draft fans regulated by the combustion controls maintain proper draft without dampers, and despite a high stack. A three-element Republic boiler feedwater system is also regulated by the combustion controls to meet water requirements at all steaming rates.



This plant is another example of how Republic combustion engineers can work to unusual and rigid specifications in designing and building combustion controls for individual requirements. To get top boiler performance and those extras that your plant needs, ask Republic to design and build your combustion control system.

REPUBLIC
FLOW METERS CO.
2240 Diversey Parkway
Chicago 47, Illinois

Wise Owl Club, Iva, South Carolina

Safety Practices Pay Off at Jackson Mills

JOHN A. McBRIDE and Charles E. Brown of Iva, S. C., have become the latest members of the Wise Owl Club of America, a chapter of which was established recently at Jackson Mills.

McBride and Brown earned their memberships in the Wise Owl Club by wearing eye protection at the time of an on-the-job eye accident. The goggles they were wearing prevented hot lead from spattering in their eyes, thereby preventing an injury or destruction of their vision, according to M. E. McDonald, safety director.

The two men were pouring molten lead into a large caulked pipe joint when the joint exploded, showering the area with the molten lead. The eye protection equipment worn by the two men was thoroughly spattered by the hot lead. This was evidence enough that both men would have sustained blinding eye injuries had they not been wearing the goggles for protection. Too much moisture in the pipe joint apparently caused the explosion, according to a spokesman for the mill.

Sponsored by the nonprofit National Society for the Prevention of Blindness, the Wise Owl program represents savings of many millions of dollars in compensation costs alone since it was first established in 1947. The savings in terms of production, purchasing power, and family welfare is incalculable.

In forwarding membership certificates for John A. McBride and Charles E. Brown, James E. O'Neil, director of Industrial Service of the Prevention of Blindness Society, said: "Welcome to the ranks of those who, by their own experience and foresight, have shown that industrial blindness can be defeated. We join with you, your families and your employer in giving thanks that your vision was saved." Brown and McBride also were awarded gold Wise Owl pins for their foresight.

Johnnie McBride (left) and Charles E. Brown show how the accident happened. While they were pouring lead into the joint, the lead exploded, covering both lenses of McBride's goggles and one lens of Brown's.

S. W. McMahan (center), overseer of shop, presents Wise Owl Club memberships to Charles E. Brown (left) and John A. McBride while M. E. McDonald, personnel manager, and B. T. Morgan, Jr. (right), superintendent, observe.

it's **boiler check-up** time!

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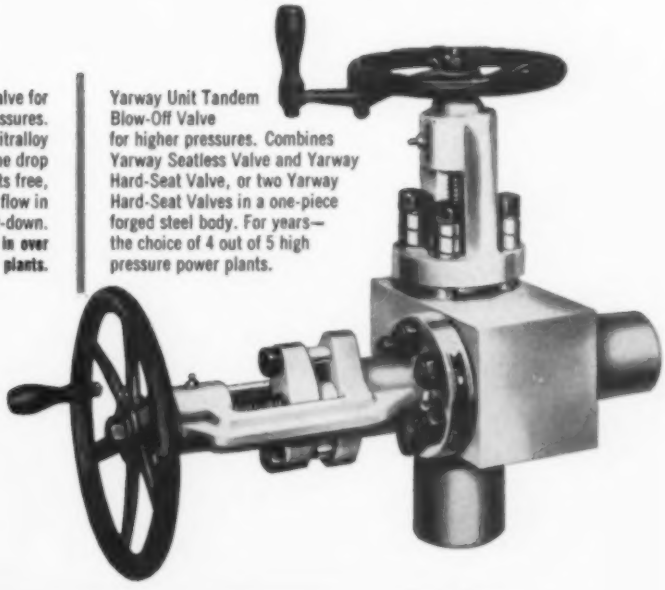
Yarway Seatless valve for low and medium pressures. Features balanced nitralloy plunger that seals line drop tight—yet permits free, unobstructed flow in blow-down. **Used in over 15,000 boiler plants.**



Yarway Unit Tandem Blow-Off Valve for higher pressures. Combines Yarway Seatless Valve and Yarway Hard-Seat Valve, or two Yarway Hard-Seat Valves in a one-piece forged steel body. For years—the choice of 4 out of 5 high pressure power plants.

YARWAY blow-off valves

Mississippi Chemical Company Chooses Cellular Glass for

Difficult Reinsulation Job

REPLACING deteriorated insulation on a 48-foot diameter ammonia storage sphere without shutting down the equipment was the problem that recently confronted officials of the Mississippi Chemical Corporation's plant in Yazoo City, Mississippi.

Temperature of ammonia inside the big sphere has to be maintained at 34 F. Trouble began when the original insulation, material of an organic composition, failed. Condensation and rain had penetrated the insulation, destroying it in less than four years.

Production Continued

William B. Dunwoody, general operations manager at the plant, explained that production would have been impaired if the sphere were shut down. To prevent this, new moisture-proof insulation was installed, a small section at a time.

The original insulation installed on the welded steel sphere consisted of two layers of two-inch thick organic composition material. The first layer was put on with hot asphalt and the second layer was impaled on wooden skewers. The outer layer then was banded with iron strapping. The entire sphere was covered with one-inch poultry mesh and this was topped with two coats of asphalt emulsion. Moisture from condensation and rain soaked into the insulation.

To offset a similar problem in the future, the company reinsulated with rigid cellular glass material that cannot absorb moisture. Moreover, because the new material is made of glass, it also is fireproof and acid-resistant—two important considerations in a chemical plant. The material, "Foamglas," was supplied by Pittsburgh Corning Corporation.

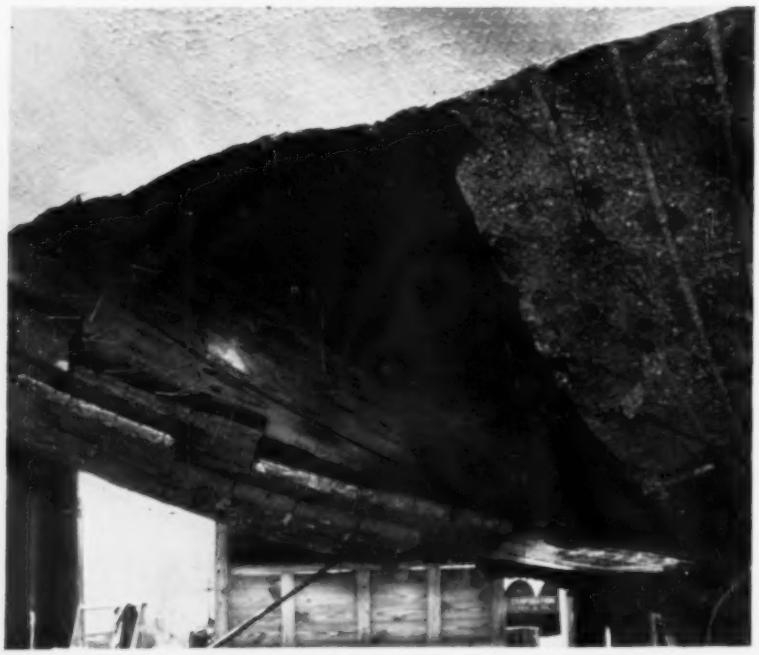
Installation

The old insulation was removed from small areas of the sphere. Then the heavy layer of rust on the plates was wire-brushed off and small steel pins were welded to the surface on nine-inch centers. A coating of asphalt mastic compound was applied and two-inch "Foamglas" insulation blocks 12 inches wide by 18 inches long were pressed on the pins. Another coating of mastic was brushed on and a second course of two-inch "Foamglas" blocks was impaled on the protruding pins. Joints of the blocks were staggered.

After installing washers and clipping off the excess length of pin, cracks and joints were pointed up and a coating of an asphalt cutback compound was applied. This was followed by another coat of mastic, a glass fabric membrane and a final application of mastic.

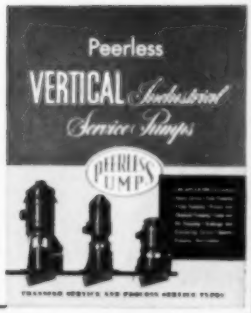
Rigid and Light

Rigidity and lightweight of the cellular glass insulation blocks facilitated their installation, Mr. Dunwoody reported. He added that the moisture resistance of the material was demonstrated during the job because heavy rain fell while the work was in progress and had no effect on the "Foamglas" which was stored in the open. Contractor for the project was North Brothers, Birmingham Branch. A companion sphere will be reinsulated in the same manner.



Deteriorated insulation on a 48-foot diameter ammonia storage sphere at Mississippi Chemical Corporation's Yazoo City plant was replaced, a small section at a time, with waterproof cellular glass material (left).

look AT THE PUMPING PROBLEM *two ways*



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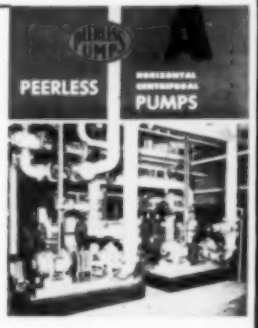

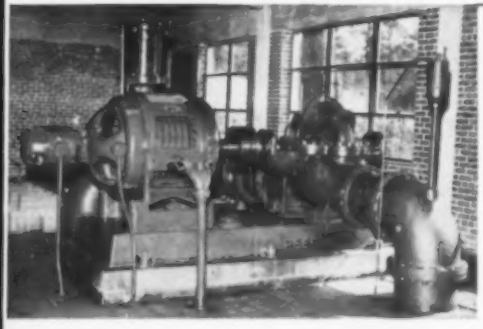

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In the picture at the top above, a concentrated solution of sulphuric acid and aluminum sulfate is being pumped by Peerless vertical industrial service pumps. To find out all about them request Peerless Bulletin No. B-505.

The Peerless horizontal type A pump shown just above, is one of three that supplies plant water for a textile mill. To find out all about them request Peerless Bulletin B-1300 and B-1350.

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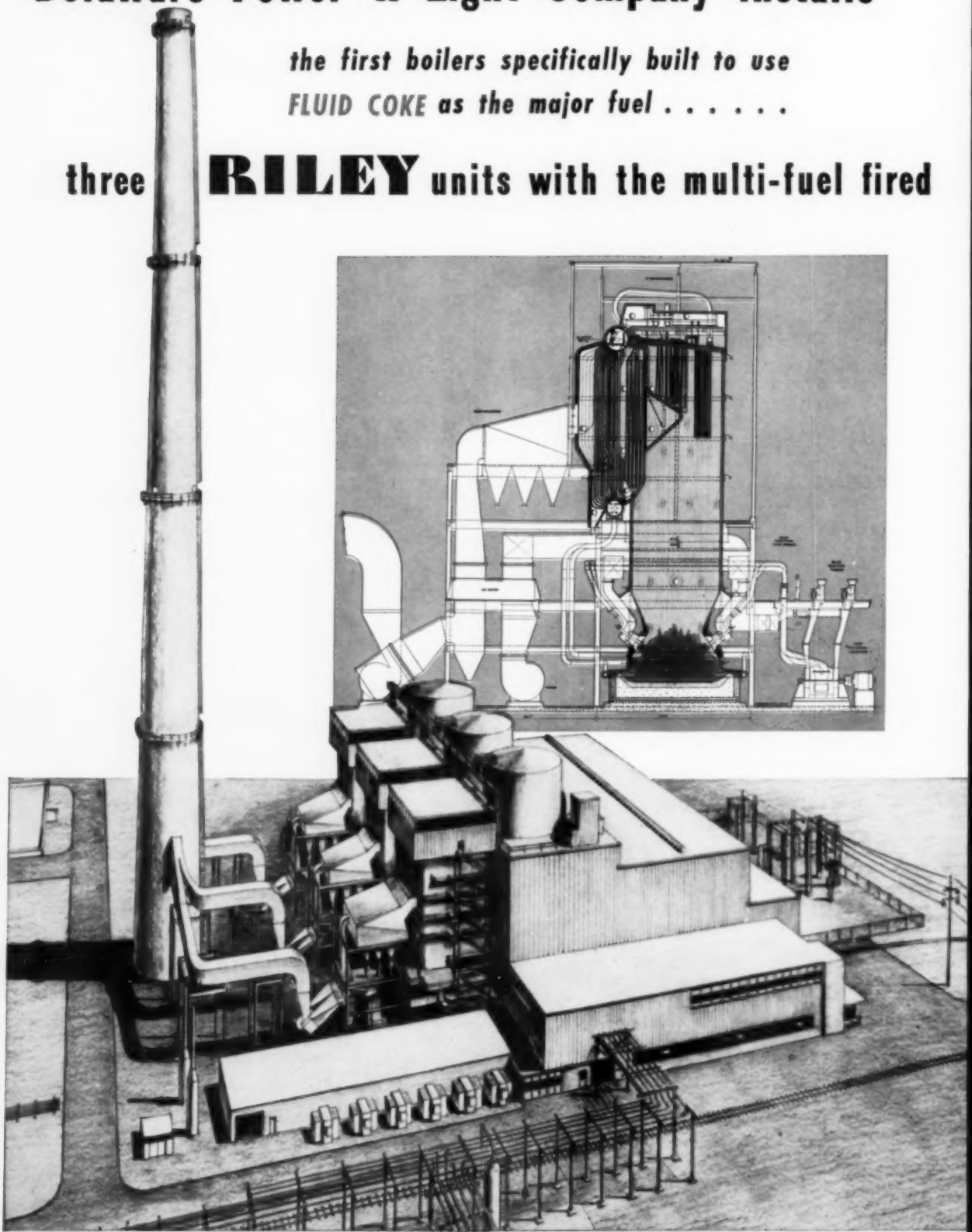

RILEY designs, engineers, manufactures and erects complete steam generating

TURBO FURNACE

Delaware Power & Light Company selected three Riley TURBO FURNACE units for its Delaware City Power Station which will supply steam and electric power requirements of Tide Water Associated Oil Company's new 130,000 barrel-per-day Flying "A" Refinery in Delaware. These units were designed particularly for efficiently firing fluid coke with a minimum of auxiliary fuel.

To burn low volatile fluid coke a furnace providing high heat concentration, high turbulence and sufficient residence time for burnout is necessary . . . and Riley's TURBO FURNACE meets these requirements. The coke, pulverized by Riley Mills, is introduced into the furnace combustion chamber by Riley Directional Flame Intertube Burners arranged for opposed firing. Fluid Coke is largely carbon; therefore, a reinjection system is used to burn the catch in the dust collection system. The design of the burners and the TURBO FURNACE will also permit the burning of refinery gas, oil and coal.

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ADVANTAGES of RILEY TURBO FURNACES

- Efficiently uses a wide range of coals, oil, natural and refinery gases, fluid coke, delayed coke, lignite.
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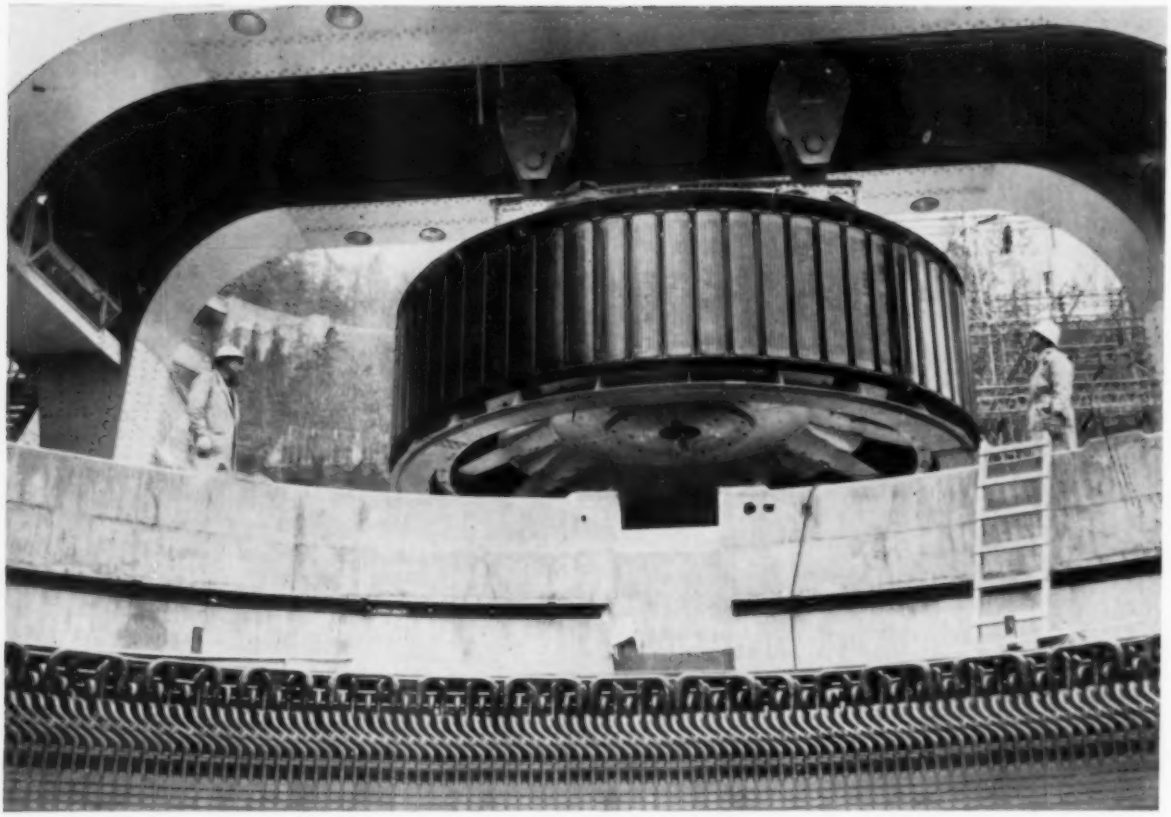

Rotor for the world's largest motor suspended at Hiwassee Dam during erection with a portion of the coils and lamination of the stator visible in the foreground. The 330 inch rotor weighs 305 tons.

WORLD'S LARGEST REVERSIBLE PUMP-TURBINE

THE WORLD'S largest reversible pump-turbine unit, designed and built by Allis-Chalmers Manufacturing Company for TVA's Hiwassee Dam, is the heart of a unique plan for storing large blocks of power.

Electrically, this dual-purpose machine is rated 70,000 kva as a hydraulic turbine-generator and 102,000 hp as a pump-driving motor — the world's largest by more than 20,000 hp. Hydraulically, it is designed to generate 80,000 hp under 190 ft head — to pump 3900 cfs against 205 ft head.

The reversible pump-turbine unit can generate power to help meet peak demands, drawing on water stored for that purpose. In off-peak hours, electric power from other plants can be used to pump water back into the storage reservoir.

The pivoted shoe-type thrust bearing is inherently suited for reversible operation. That for the Hiwassee machine supports a total of 1,365,000 pounds. The high pressure lubricating system operates in the starting cycle, establishing a film of oil between thrust bearing surfaces so effectively that one man can readily start the machine rotating by pushing against an arm of the rotor spider.

A ring of 20 adjustable wicket gates controls the flow of water. When starting as a pump, the wicket gates are closed and a compressed air blow-down system dewaters the runner. This reduces motor starting torque. The motor is then started and brought up to speed. Release of air pressure allows the water level to rise in the impeller, the wicket gates slowly open to the proper setting and water flows up the penstock into the storage reservoir. The 226 in. turbine runner and the generator-motor stator were shipped in three sections. The rotor spider was too large in diameter to meet shipping limits, and it also was shipped in sections and bolted together at the dam site. Rim laminations and field poles were assembled on the spider just prior to installation. Finished rotor weight was over 300 tons.

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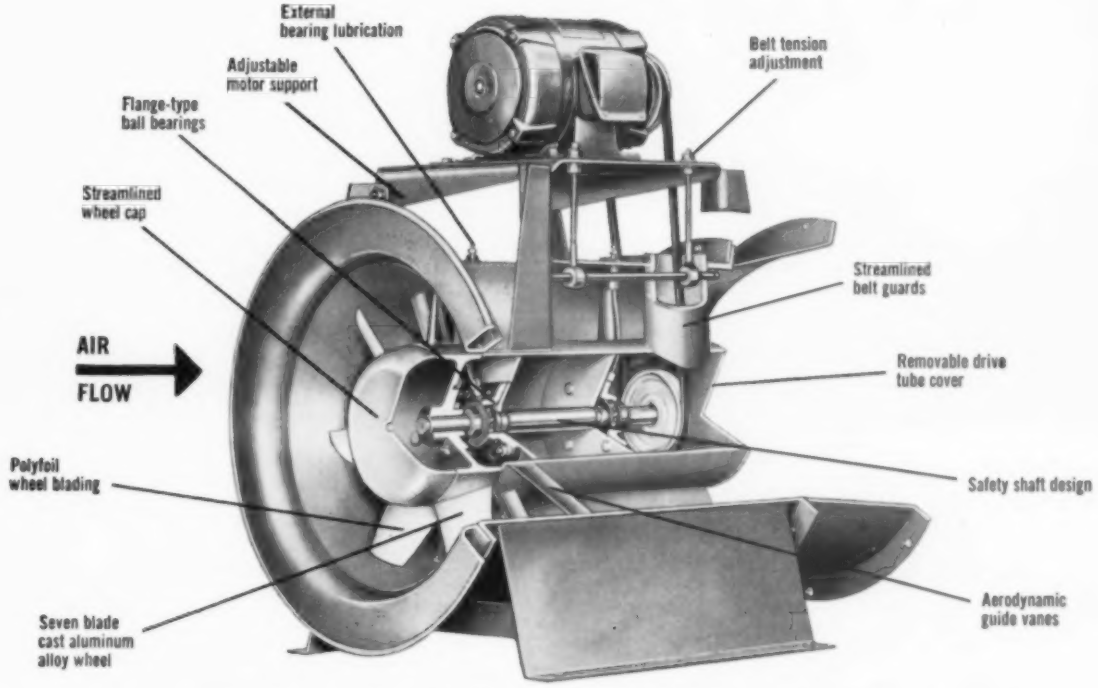

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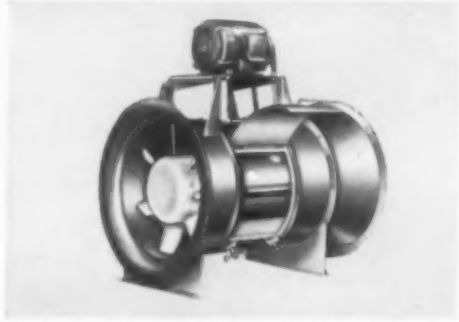
For complete application service, call your nearest Sturtevant Sales Engineer, or write Westinghouse Electric Corporation, Sturtevant Division, Dept. 21-F, Hyde Park, Boston 36, Mass.



Spray booth Vaneaxial Fan specially designed to provide easy access required for paint spray exhaust!

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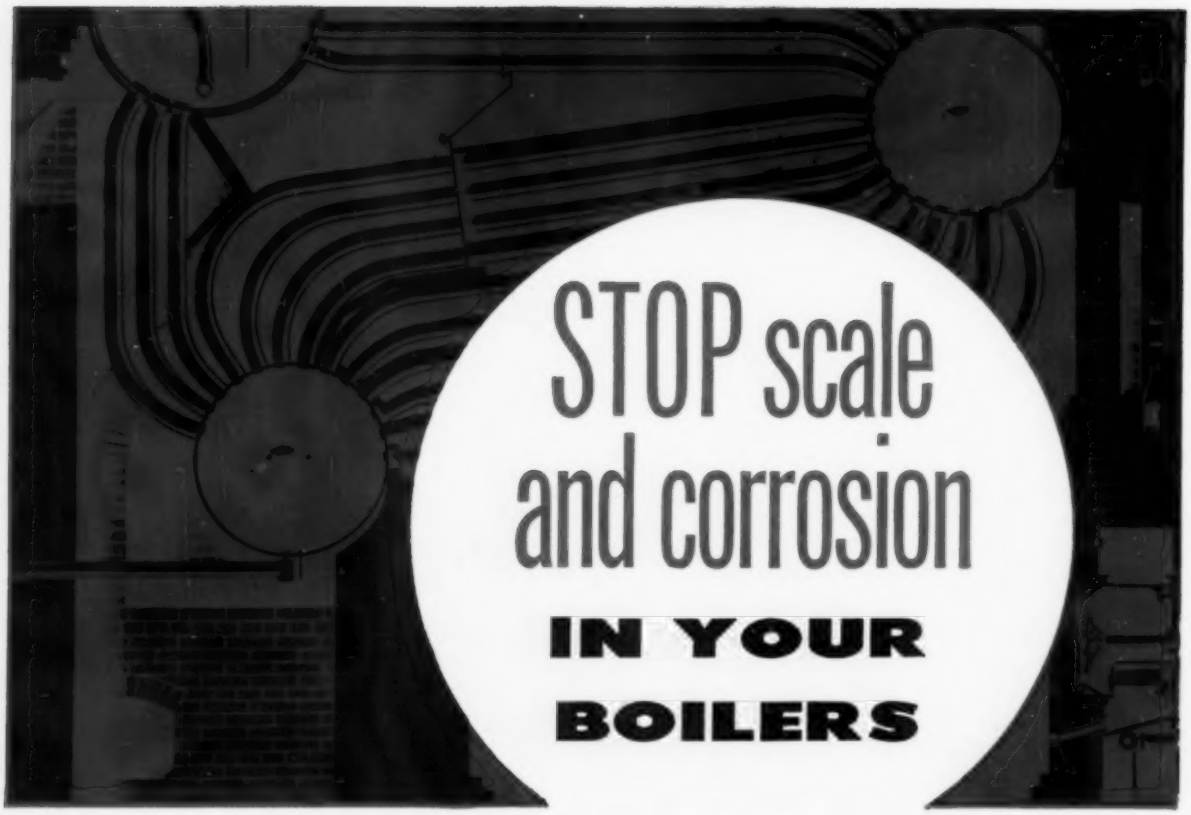

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There's an Anderson field representative in your area who has broad experience in every kind of industrial water problem. He will gladly analyze your water and prescribe the proper treatment to protect your equipment against costly corrosion and scale. What's more, he will continue to make periodic analyses to be sure you are being properly protected. The valuable service costs you nothing. It can save you much. Let us know when you would like to see him.

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BF-23

Characteristics of Large Motor Thrust Bearings

Selection, Application, Maintenance

THIS CHART on selection of thrust bearings should be valuable to anyone responsible for planning, engineering or maintaining vertical motor installations.

More and more vertical motors are being used in process industries, water supply and irrigation systems, storm water pumping plants, etc. Often it is not a matter of "Leave the bearings up to the manufacturer," because manufacturers sometimes differ in what bearings they recommend. A plant engineer may need information on the characteristics of principal types of thrust bearings when he gets two or more expert but different opinions.

The information in the enclosed chart provided by Electric Machinery Mfg. Company gives the general picture of thrust bearing practice for motors of 200 hp and larger. With minor modification, the facts apply to equipment of most manufacturers.

Selection and Application of Commonly Used Thrust Bearings For Large Vertical A-C Motors

	BALL BEARINGS Deep Groove or Angular Contact	ROLLER BEARINGS Spherical or Tapered	KINGSBURY Thrust Bearings
THRUST CAPACITY	Low-to-moderate. Can be stacked in duplex or triplex mountings, providing thrust for angular contact type up to 20,000 pounds, depending on speed. Capacity of deep groove type somewhat lower.	Relatively high -- up to 100,000 lb., depending on speed.	Very high -- up to hundreds of tons, depending on speed.
SPEEDS	Moderate, up to 1800 rpm for grease lubricated bearings, depending on size and duty. Higher where oil lubrication provided.	Moderate -- Up to 1200 rpm, depending on duty.	Low, medium or high.
LUBRICATION	Usually grease lubricated. Can be oil-lubricated at higher speeds to help dissipate heat and avoid frequent greasing. Occasionally low speed bearings are oil-lubricated, with bearing partially or completely submerged in oil.	Oil, because of size and complexity of bearing. Generally partly submerged in the lubricant.	Bearing submerged in oil. Rotating collar separated from stationary babbited shoes by film of oil, so there are no rubbing surfaces.
COOLING	By oil, where oil lubrication used.	Rotation circulates cool oil through the bearing. On larger sizes and high speeds, bearing can be water cooled, with cooling coils in oil reservoir.	Viscosity pumping effect of thrust collar circulates oil within the housing and over cooling coils, if provided.
ADVANTAGES	Grease lubricated bearing not as sensitive to mishandling at assembly or during maintenance as oil-lubricated bearing, and operates better in dirty or dusty surroundings. Lightly loaded and capable of handling short-duration overloads of several times design capacity. Deep groove bearings take upward thrust. Accomplished with angular contact bearings by back-to-back arrangement so that one bearing handles upward thrusts.	Available in larger sizes than most other bearings, with inherently greater capacity of rollers over balls. Spherical roller bearings are self aligning, resulting in equal distribution of the load.	Self aligning through action of leveling plates providing equal distribution of load. Accessible for maintenance if required. Available for high speed, high thrust applications. Indefinitely long life, if properly maintained.
LIMITATIONS	Not self aligning, so bearing housings, caps, etc., require close tolerances.	Relatively larger than ball bearings. Do not take upward thrust.	Relatively high first cost. Often requires cooling water supply. Large physical size. Greater friction loss than Anti-friction bearings.
MAINTENANCE	Requires small amount of grease at intervals, per manufacturers recommendation. Provision made for removing expended grease without costly disassembly.	Lubrication oil must be kept at proper level, changed at intervals.	Lubrication oil must be kept at proper level, changed at intervals.

Electric Machinery Mfg. Company, Minneapolis , Minnesota

When the pressure is on

As a final step in the manufacture of Powell Valves, every valve is subjected to an *actual line test*—a *positive method* of testing. For special services, valves can be given hydrostatic, air and gas tests so that they will meet various fluid control services.

Thus, when the pressure is on *you*—when you have a production schedule that must be met—that's when you'll be glad you installed Powell Valves.

No matter what your flow control problem may be, Powell has valves designed to solve your problem. And you can *depend* on long, trouble-free service. Through careful quality control, *every* Powell Valve has PERFORMANCE VERIFIED.

Because of Powell's painstaking quality control, plant shutdown through valve failure is greatly reduced. Records from refineries, power and industrial plants the world over prove it.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our *complete quality line* which has *Performance Verified.*

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FIG. 3061-WE—300-Pound Steel Swing Check Valve

FIG. 19003—900-Pound Steel Pressure Seal Gate Valve

FIG. 1314-A—1500-Pound Integral Bonnet Steel "Y" Valve

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WELDOLETS

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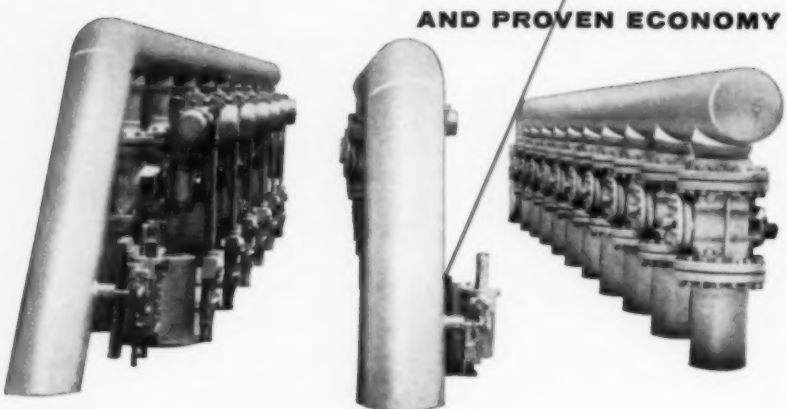

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Are you effecting this economy for your company? Neat and uniform appearance is evident in code constructed weldolet headers in this crude oil pipeline terminal. The money saved is in the bank and does not appear in this picture. If you are not using the weldolet method of cutting piping costs, write today for information.

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Operating Changes Affect Insulation

TROUBLE in steam transmission is often attributed to inadequate insulation or insulation failure, when it may be due to a change in operations. This should be investigated, particularly where steam was previously satisfactory but is no longer available at required temperature after an operational change, according to The Magnesia Insulation Manufacturers Association.

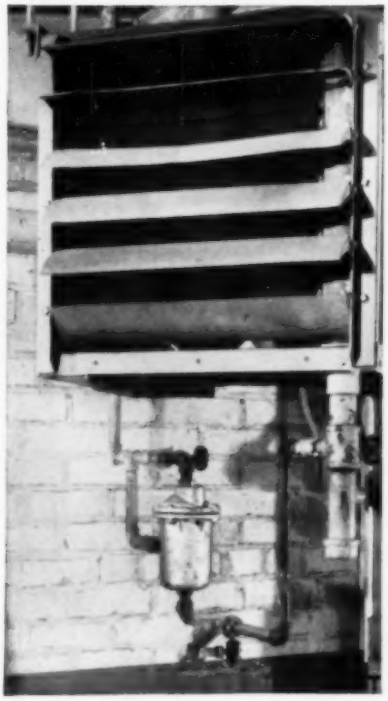
A hypothetical case is represented by an operation where steam has been supplied to a pilot plant at 2,500 lb/hr flow through an outdoor line 600 ft long. In the original operation, steam entered the line at 520 F and 130 psia and was delivered, free blowing at the end of the line, at 450 F. To meet these requirements, the pipe line had been sized 1½ in. and insulated with 1½ in. thick 85% Magnesia. This provided an allowable heat loss in the line of 23.0 Btu/lb steam with an ambient temperature of 50 F and a 15 mph wind.

A change in process requirements resulted in a steam flow decrease from 2,500 lb/hr to 1,000 lb/hr. At this reduced steam flow rate, heat loss is now 55.4 Btu/lb, as against the allowable loss of 23.0 Btu/lb. Process steam is no longer available at the pilot plant at the required temperature of 450 F.

Where a situation such as this is encountered, there are two solutions to the problem. If the reduction in steam requirement is permanent, the 1½-in. line may be replaced with a 1-in. line, with the same thickness of insulation applied. If the reduction in steam demand is temporary, and if there is available superheat at the boiler house, it may be advisable to raise the steam temperature to 550 F, and increase the thickness of the 85% Magnesia insulation to 3 in. This will increase the allowable heat loss to 38.3 Btu/lb and provide process steam at the required temperature.

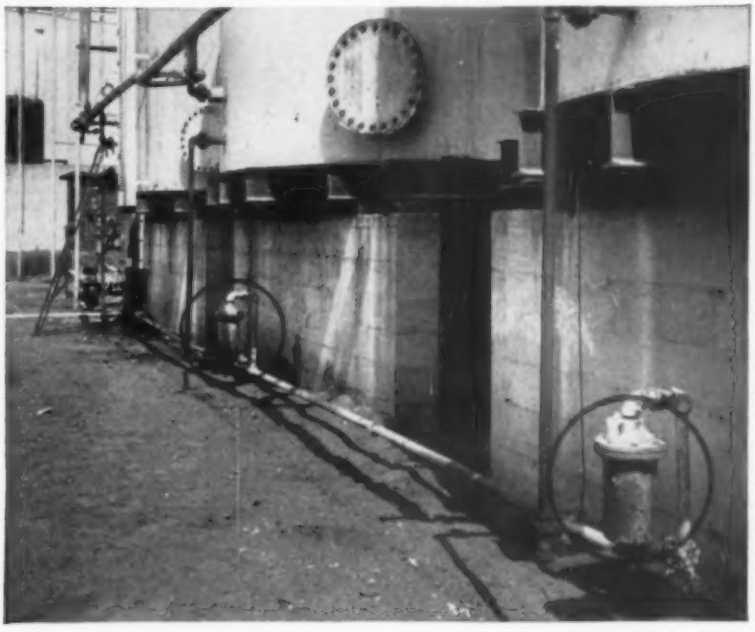
Steam troubles and wasteful heat loss in hot piping and equipment may also be due to damaged or loose insulation. Normal maintenance should include inspection of the finishes, fastenings and the insulation itself.

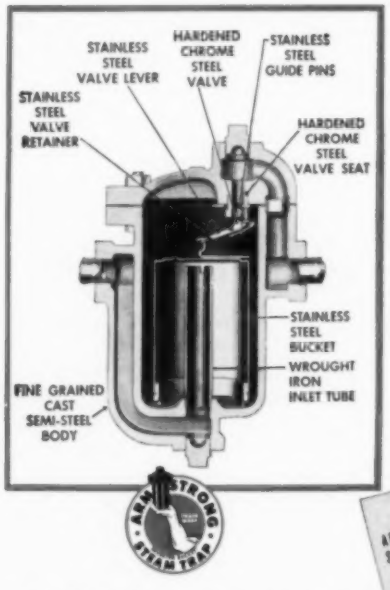
Major Chemical Company Reports Armstrong Traps Cost Less to Maintain



INDOORS—Mr. George Gentes, Works Manager at Hooker Electrochemical Co., Tacoma, Wash., says, "We feel that we get excellent service with Armstrong traps. We have been using them for about 10 years."

OUTDOORS—these Armstrong traps give year 'round service at Hooker's big Tacoma plant.




STAINLESS STEEL VALVE LEVER
HARDENED CHROME STEEL VALVE
STAINLESS STEEL GUIDE PINS
STAINLESS STEEL VALVE RETAINER
HARDENED CHROME STEEL VALVE SEAT
STAINLESS STEEL BUCKET
WROUGHT IRON INLET TUBE
FINE GRAINED CAST SEMI-STEEL BODY
ARMSTRONG STEAM TRAP

Simple, dependable Armstrong traps mechanisms have only two moving parts —bucket and lever. Design, materials and workmanship in low and medium pressure traps identical to that of traps for 900 lbs., 900°F service!

Trap's Lot is a Hard One. A steam trap takes a lot of punishment. On some jobs it may operate *1,000,000 times a year*. The parts are subjected to dirt, scale and corrosive substances, high temperatures and the erosive action of the condensate.

Armstrong's Take it Well. Armstrong traps endure these conditions remarkably well. In reporting on less trap maintenance since installing Armstrong traps Mr. George Gentes, Works Manager of Hooker Electrochemical Company's plant at Tacoma, Washington stated:

"We get excellent service . . . our trap maintenance cost is very low."

Others Agree. More Armstrong customers mention low maintenance than any other single benefit. That means more than low repair costs. It means freedom from leaky traps that waste steam, freedom from faulty traps that slow up production —freedom from *trouble*.

A Suggestion. Send for the Armstrong Catalog listed below or, better yet, call your local Armstrong Representative or Distributor —he's exceptionally well qualified to help you improve your trapping situation.

ARMSTRONG MACHINE WORKS
806 Maple Street • Three Rivers, Michigan

FREE
44-PAGE STEAM TRAP BOOK—Send for yours —no obligation.

ARMSTRONG MACHINE WORKS
806 Maple Street, Three Rivers, Michigan
Please send Steam Trap Book to:

Name_____
Company_____
Address_____
City_____ Zone___ State_____

The Hoist Is a Maintenance Tool but

Who Maintains the Hoist in Your Plant?

HOISTS are built to be mounted out of reach, and being out of reach they are often out of mind as far as maintenance is concerned.

From the moment a new hoist arrives in your plant for installation you are responsible to a great extent for the kind of service it will give you during the coming years. Resist that impulse to snatch off all those instruction tags fastened about the hoist. That's the best way to start your new hoist out with poor maintenance. These tags are used to help you get your new hoist off on the right track, in a maintenance sense, for poor installation is poor maintenance. The tags serve as a check list to assure that basic lubrication will be accomplished, that vented plugs will replace solid shipping plugs and that wiring will be properly connected . . . simple things, but important.

Is Installation Complete?

The hoist is hanging; tags have been removed and checked; correct phasing has been checked and the hoist block raises when the "up" button is depressed; the hoist lifts, travels, stops and lowers at your command. But have you checked trolley wheel clearance (⅛ inch between beam flange and wheel for straight track, slightly more for curves)? Is the hoist centered and level under the beam? Do the trolley wheels run smoothly over beam joints to minimize wheel wear? Do the trolley bumpers, rather than the wheels, stop the hoist at the end of the beam? Does your power supply match the ratings shown on the hoist data plate and has an adequate ground been made? How about the current pickups? Excessive arcing indicates adjustment is needed.

Day-to-Day Maintenance

Watch out for overloads. They shorten hoist life and set the stage for serious accidents. Be sure, too, that the beam on which the hoist is hung is securely mounted and will carry the load.

Keep hoisting cables lubricated with 600W. Be sure they always have plenty of lubricant to reduce wear. Swapping the cable end-for-end will equalize wear and give you a chance to check for frayed or broken strands. Be sure that when the hook is at its lowest point there are still at least two wraps of cable around the drum. This will ease strain on the cable anchorage and prevent the possibility of winding the cable up on the wrong side of the drum, thus reversing the controls and cancelling out limit switch operation.

Once a Month

Check oil level in the gearcase, wear on sheaves, condition of the cable, cleanliness of beam tracks, and general hoist operation throughout the system.

Twice a Year

Check the motor coupling for wear. This can eliminate a major maintenance job in replacing torn keyways.

Fibroid coupling discs should be fairly dry. When they get too oily they loose effectiveness and wear unduly.

Generally, the motor should be lubricated only twice a year, and then according to the manufacturer's specifications, not according to your own whims! Why?—because one of the major causes of motor failure is *over*—lubrication.

Motor brushes (direct current and wound rotor motors) should be checked for cleanliness and wear. Replace worn brushes if you want to keep your hoist operating most efficiently.

Once a Year

Check cable drum and sheaves for wear. Clean the hoist thoroughly. Check the entire system for signs of wear and failure. Replace seals or gaskets where there is evidence of lubricant leakage. Lubricate controller fingers and segments sparingly with petroleum jelly. Check trolley alignment, current pickups and insulators.

New Cable

Wire rope is not necessarily hoist cable. Only genuine plow steel cable should be used as replacement. And good maintenance means that you have a spare cable on hand. It's also good maintenance when you change cables to install new sheaves if there is the slightest sign of abnormal wear or grooving. Also make sure the drum and the cable socket are not worn or damaged. Don't allow the new cable to kink or twist as you uncoil it—this can mean early failure. Lubricate the new cable as it is installed and be sure it is evenly wound on the drum without pinches or crossovers.

Spare Parts

A "typical" spare parts list should cover those parts most subject to wear and would include most of the following:

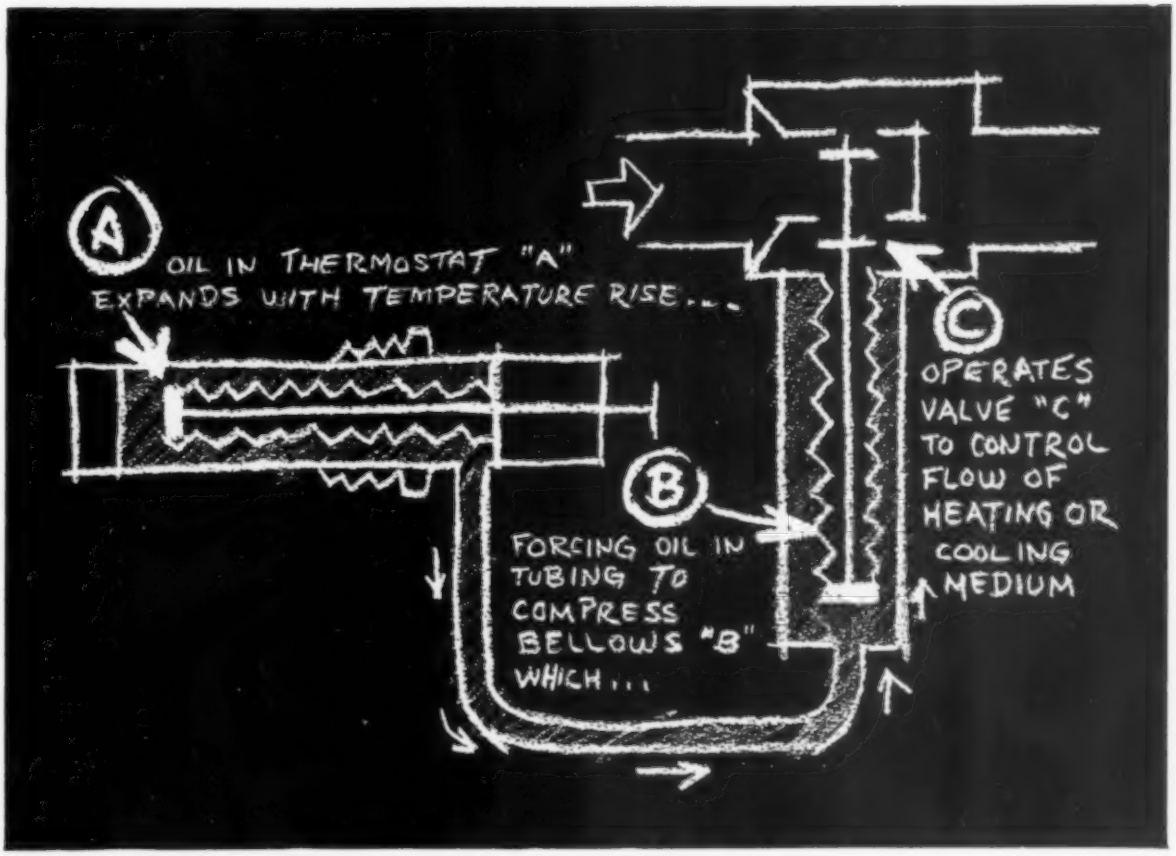
Cables
Load brake friction disc
Motor coupling
Fibroid coupling discs
Hook assembly
Coils and contacts
Motor brake friction discs

This list is not specific to any one hoist, so consult your manufacturer for recommendations. Remember . . . when ordering spare parts always include as a part of your order the serial number of the unit. This number is usually given on a special plate on all electric hoists.

Save Those Booklets

The booklets that are packed with your hoist are source material for good hoist maintenance. Be sure to put them where they will not be lost and where you can get them quickly when things go wrong.

Courtesy Robbins & Myers, Inc.


A
OIL IN THERMOSTAT "A" EXPANDS WITH TEMPERATURE RISE...
B
FORCING OIL IN TUBING TO COMPRESS BELLOWS "B" WHICH...
C
OPERATES VALVE "C" TO CONTROL FLOW OF HEATING OR COOLING MEDIUM

Automatic Temperature Control

AS SIMPLE AS A-B-C !

And what could be simpler!

Just take another look at that rough sketch. That's all there is to it. A simple thermostat – a length of tubing – a valve. That's all!

That's the trouble-free design of the Sarco SELF-POWERED temperature control. And each year, thousands give accurate service in all industries ...for firms such as Colgate-Palmolive Company, Sinclair Refining Company, Swift & Company.

These temperature controls are simple, inexpensive, dependable, effective. No highfalutin gadgets that take a technician to read and a specialist to fix! Self-contained—no exposed mechanism. Packless. No outside power connections. Can be installed by any pipe-fitter.

And you'll find these temperature controls wonderful for about 85% of your jobs...all but those few specials that call for elaborate, costly control.

Cost? Mighty low! For example, the ½" size is yours for about $100. It's good economy to specify AUTOMATIC temperature control for ALL control jobs, not just the big ones.

SARCO COMPANY, INC.

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.
Please send information on your simple, inexpensive temperature controllers:

☐ Self-powered type for use on_____

☐ Electric indicating type for use on_____

Name_____

Firm_____

Address_____

City_____ State_____

21369

HELPING the *MAN-IN-THE-PLANT*

Explanation of Bolt Stresses

STRESS conditions vary for different types of joints, say Russell, Burdsall & Ward fastener experts, yet many engineers operate under the fallacy that external loads always add to the stress in the bolt.

In a rigid joint—one where two hard surfaces are bolted together and may be considered a solid unit—external loading does not increase stress in the bolt unless the external load is greater than the residual tension in the bolt.

In a flexible joint, external loading adds to the tightening stress. Bolt stress is thus the sum of residual tension plus external load.

A flexible joint is one in which (1) two soft surfaces are bolted together, (2) one hard and one soft surface are bolted together, or (3) two surfaces, separated by a gasket to prevent leakage, are bolted together.

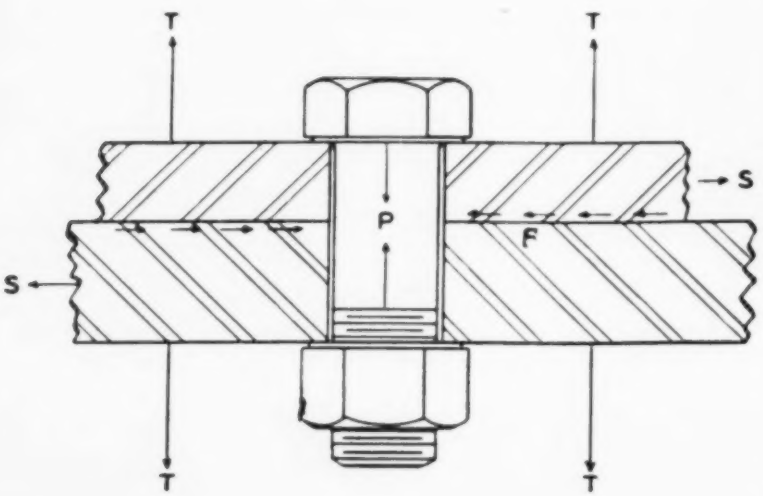
In a rigid joint, the bolt should be torqued as near as possible to its yield strength so that it will resist a maximum amount of external load without loosening, advise the R B & W engineers. In a flexible joint, the bolt should be torqued just enough to prevent leakage, leaving the balance of its strength to take care of external loading.

Effect of Forces

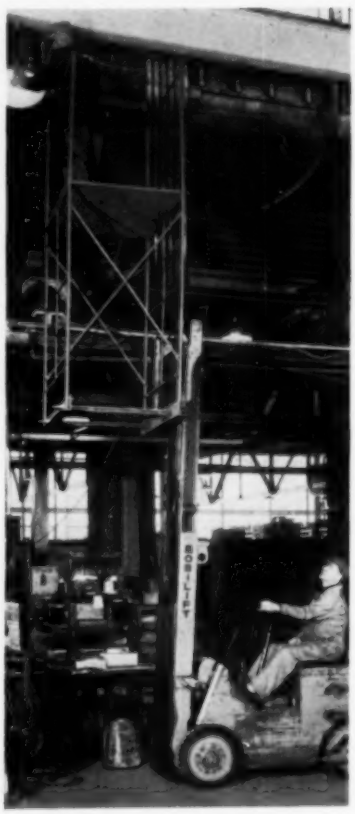
The function of preloading is indicated in the accompanying drawing. Preloading tension, **P**, is developed in the bolt shank by torquing the head or the nut. Tensile forces, **T**, may be applied to the bolted structure, but so long as their reaction at the bolt does not exceed **P**, there can be no separation of the parts nor extension of the bolt.

Thus there is no increase in the tensile load on the bolt, and tension in the bolt remains at the preload value **P**, if the bolted material is well fitted and rigid compared with the bolt.

Shearing forces, **S**, may be applied to the structure, but the joint does not slip if the frictional resistance between the parts, **F**, as produced by **P**, is not exceeded by the shearing forces, **S**. If the joint does not slip, there is no shear on the bolt nor change in load from its initial preload value. In a connection, such as the one illustrated, stress in one plate is transferred to the other plate by friction at areas remote from the edge of the hole, thus avoiding high stress concentration near the hole.



Danger Removed from Overhead Maintenance



Courtesy Samson Corp.

MUCH DANGER is removed from overhead maintenance through use of a special "Cage" type scaffold transported and elevated by a lift truck. The workman, with his tools and supplies, can be placed right at the job without climbing.

New Sarco Thermodynamic Steam Trap practically eliminates maintenance!

Only moving part—a hardened Solid Stainless Steel Disc—practically wear-proof!

SOME OF MANY ADVANTAGES

1. Same trap for all loads and pressures 10-600 psi.

2. Closes tight on no load.

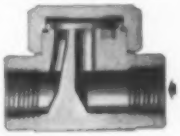
3. Operates against back pressures up to 50% of inlet pressure.

4. Not affected by superheat, water-hammer, vibration, corrosive condensate.

5. Smallest inventory of spare parts.

SIMPLICITY—to the Nth degree!

No valve-closing mechanisms to wear or stick. No critical clearances to choke. No gaskets to leak. Three simple parts...machined from stainless steel bar stock. Only one moving part.
What could be simpler?



SARCO COMPANY, INC.

2133-B

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

Please send me: ☐ Bulletin 255-44
☐ A Sarco Thermodynamic Steam Trap for 60-day trial. Size_____ for installation on_____

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

Tips for Longer Conveyor Belt Life

CONVEYOR belt users will wish to check their present practice against these suggestions which are furnished by Thermoid Company.

1. **Select Proper Belt**—choose a belt that is designed for the materials to be carried, temperatures encountered, and tension required.
2. **Design Supporting Structure Carefully** — check diameter of pulleys, spacing of idlers, take-up mechanism, load-point.
3. **Correct Storage**—if belt is not installed at once, store out of sunlight, away from hot pipes, stoves, radiators.
4. **Avoid Handling Damage**—when received from manufacturer, don't drop a heavy roll of belt off truck or railroad car—skid, roll or lift it.
5. **Plan Installation**—threading of belt over idlers and pulleys is critical. Avoid bending belt sharply. Take care not to drag over sharp, rough surfaces. Before belt is run, check for tools left accidentally on return side.
6. **Check Belt Alignment** — supporting structure should be aligned with a transit. Misalignment causes crooked running and edge wear.
7. **Strive For Ideal Loading**—material should be loaded on belt in the same direction and at same speed, as belt travel. Load middle of belt, not sides.
8. **Avoid Impacts From Lumps**—load hard lumpy material on top of fines, wherever possible. Use finger bars or chain baffles to reduce velocity of lumps at loading point. Direct load to strike belt between idlers, if possible. Keep distance from chute to belt at a minimum.
9. **Use Impact Idlers** — in extreme cases such as larger rock lumps, load over rubber-covered or pneumatic idlers to reduce hammer-anvil effect on belt, which causes ruptures.
10. **Design Rugged Loading Chute** — loading chute should be permanent, strong, securely fastened device. Avoid jerry-built, "baling-wire" contrivance which may loosen and drag on belt.
11. **Guide Material With Skirt Boards**—skirt boards should not touch belt. Distance between belt and board should increase in direction of travel so wedged-in lumps will free themselves.
12. **Fix Responsibility for Belt Maintenance** — assign a "belt-boss" to check belt, make repairs and adjustments.
13. **Inspect Belt On Schedule**—"belt boss" discovers small rips, tears, worn spots before real damage can be done and pays particular attention to splices.
14. **Maintain Belt Repair Kit**—tools, splicing fasteners, rubber cement, patching rubber, rip plates should be ready at all times for making belt repairs, at once, as soon as discovered.
15. **Cover Return Side With Deck**—keep spilled material off return side, with metal or wooden decking to prevent lumps from running between belt and terminal pulley. Brushes or scrapers are beneficial.
16. **Cover Belts**—a metal or wooden cover will protect belts installed outdoors against sun and against weather.
17. **Keep Cost Records**—continuous records of maintenance and repair costs against tonnage carried will indicate service quality.
18. **Lubricate Wisely**—check idlers regularly for adequate grease but avoid excess grease which will smear belt and shorten life.
19. **Interconnect Conveyors**—provides means of automatically shutting off preceding belts in a series to prevent pile-ups of material if a following conveyor stops.
20. **Develop Belt Safety Rules**—provide guards around drives, prohibit personnel from riding on belt, install frequent shut-off switches, equip belt for harmless discharge of static electricity, control dust at transfer points with exhaut hoods, etc.

Standardized Steam Trap Hookups

IN ORDER to facilitate and reduce the cost of trap installation and maintenance, engineers of a chemical company have developed standardized trap hookups. Each hookup provides these time and cost-saving advantages:

1. Test valve in trap cap to permit fast, easy checking of trap operation so that any failure can be quickly detected to avoid waste.
2. Strainer ahead of trap to protect it against dirt and scale.
3. Blowdown valve in strainer to provide easy cleaning.
4. Check valve in discharge line to isolate trap when test valve is opened.
5. Shut - off valves and unions ahead of and following, trap to permit removal of entire trap from line.

Exact dimensions are maintained for the standardized pipe fittings, including nipples connected to each size of trap.

When a trap needs repair, the unions can be uncoupled, the trap lifted from the line, and a "spare" carrying identical length nipples and half-unions slipped in place. Thus, in as little as one or two minutes, a faulty trap is replaced. It is then returned to the storeroom for repair and takes its place as a "spare."

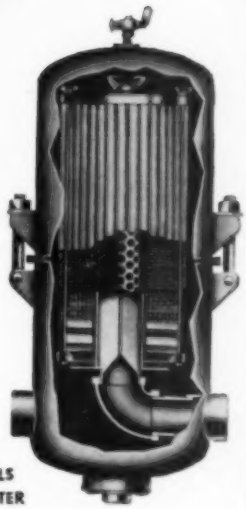
No Bypasses

Because of the rapid spare trap interchangeability, there is no need for bypasses to keep a unit in operation in event of trap failure. The cost of bypass installations is

Do You Have Trouble Filtering These Liquids?

YOU NEED

STAYNEW LIQUID FILTERS

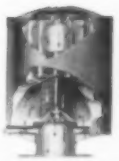


MODEL ELS
LIQUID FILTER

Name a liquid . . . any liquid! Somewhere in the world it is undoubtedly filtered efficiently and economically by a Staynew Liquid Filter. The world-wide use of Staynew Filters on thousands of liquids is proof of their adaptability to virtually any requirement. All known types of filtering media are available for any problem regardless of temperature, pressure, or corrosion factors. And, all Staynew Model ELS Liquid Filter bodies are available in steel, stainless steel, monel, herculoy and other non-corrosive materials. Construction can be according to ASME or API Code specifications. Let us know your requirements.

SOME OF THE LIQUIDS EFFICIENTLY FILTERED BY STAYNEW LIQUID FILTERS

- Acetone
- Acids
- Adhesives
- Alcohols
- Alkalis
- Ammonia
- Asphalt
- Benzene
- Benzine
- Beverages
- Butane
- Casein
- Castor Oil
- Caustic
- Cellulose Solutions
- Chlorine
- Chocolate
- Cleaning Fluids
- Coating
- Coolants
- Cutting Oils
- Emulsions
- Enamels
- Ethanolamine
- Ethylamine
- Extracts
- Flameproofing Solutions
- Fuel Oil
- Furniture Polish
- Gasoline
- Glue
- Greases
- Gums
- Hydraulic Fluids
- Ink
- Kerosene
- Lacquers
- Latex
- Liquid Paraffin
- Lubricants
- Molasses
- Naphtha
- Paint
- Pharmaceuticals
- Propylene
- Quenching Oils
- Resins
- Rubber Cements
- Sizing
- Soap
- Solvents
- Steam Condensate
- Syrups
- Tar
- Turpentine
- Varnish
- Vegetable Oils
- Viscose
- Water
- Wax



INTAKE FILTERS

LIQUID FILTERS

PIPE LINE FILTERS

ELECTRO-STAYNEW PRECIPITATOR

AUTOMATIC AIR FILTERS

PANEL FILTERS

SPECIAL FILTERS

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ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

Send for 12-page Bulletin 300. Contains engineering and performance data, photos, descriptions of filtering media, recommended use of each, and other helpful data.
Dollinger Corporation, 40 Centre Park, Rochester 3, N. Y

LIQUID FILTERS • PIPE LINE FILTERS • INTAKE FILTERS • HYDRAULIC FILTERS
ELECTROSTATIC FILTERS • DRY PANEL FILTERS • SPECIAL DESIGN FILTERS
VISCOUS PANEL FILTERS • LOW PRESSURE FILTERS • HIGH PRESSURE FILTERS
AUTOMATIC VENTILATION FILTERS • NATURAL GAS FILTERS • SILENCER FILTERS

avoided, as is the waste that occurs when bypasses are in use, or accidentally left open.

It is interesting to note here that before the steam conservation program was put into effect, bypasses around traps were frequently left open—not always because of trap failure, but sometimes because of reducing valve failure which allowed pressure to exceed maximum trap operating pressure.

Condensate Headers

Another installation technique which saves installation and maintenance cost is the use, wherever possible, of trap manifolds.

Traps and manifolds are assembled in the plant pipe shop under ideal conditions for good workmanship and minimum time consumption. After assembly the manifolds are taken to the site of installation where lines from units in the vicinity are run to the traps.

Traps are thus grouped where they can be found easily and where they are readily accessible for inspection and replacement.

Courtesy Armstrong Machine Works.

Shop Made Jig Helps Balance Engine

WE WERE having trouble with vibration and engine grout failure on an 1100 horsepower gas engine driven compressor. As a remedy, we installed two throw counterweights on the power crank to reduce vibration.

To install these counterweights, we had to drill and tap four holes in the crankshaft for 1¾ inch — 8 thd studs. Locating and aligning these holes accurately proved to be time consuming and difficult. The answer to this problem was found in the use of a drilling jig.

The jig was accurately made in our shops and was equipped with three sizes of removable, hardened steel guides: one for a 1-19/32" drill, one for a 1⅝" reamer, and one for a 1¾" tap.

The jig was used by clamping it onto the crankshaft by three set screws (see photo). We could then drill, ream, and tap the holes **without disturbing the location of the jig** by changing the guide bushing when each step was completed.

By B. J. WAREN, Maintenance Engineer, Carbide and Carbon Chemicals Company, Texas City, Texas.

Use a Thermometer to Measure Bearing Temperatures

PUMP BEARING temperatures are frequently estimated by placing a hand lightly against the bearing housing or shell. If the bearing is "cool" or "warm" we feel assured. If it feels "hot" we may become concerned and spend considerable time and effort to reduce the temperature until the housing feels only "warm" without any clear idea of the actual operating temperature.

Unfortunately, the human hand is not an accurate thermometer and can give a danger signal falsely. A temperature which feels "hot" varies from 120 to 130 F depending on the individual. Above this temperature the human hand is worthless in estimating temperature.

Grease lubricated ball and roller bearings can be operated safely at temperatures up to at least 200 F. In fact, the upper operating limit on anti-friction bearings is determined solely by the temperature at which the lubricant fails and begins to carburize.

Bearing temperatures up to 160 F are extremely safe. Operation of bearings at this temperature is not at all undesirable, as a better flow of lubricant can be expected. This gives a clear indication of why a thermometer is necessary to determine bearing temperature.

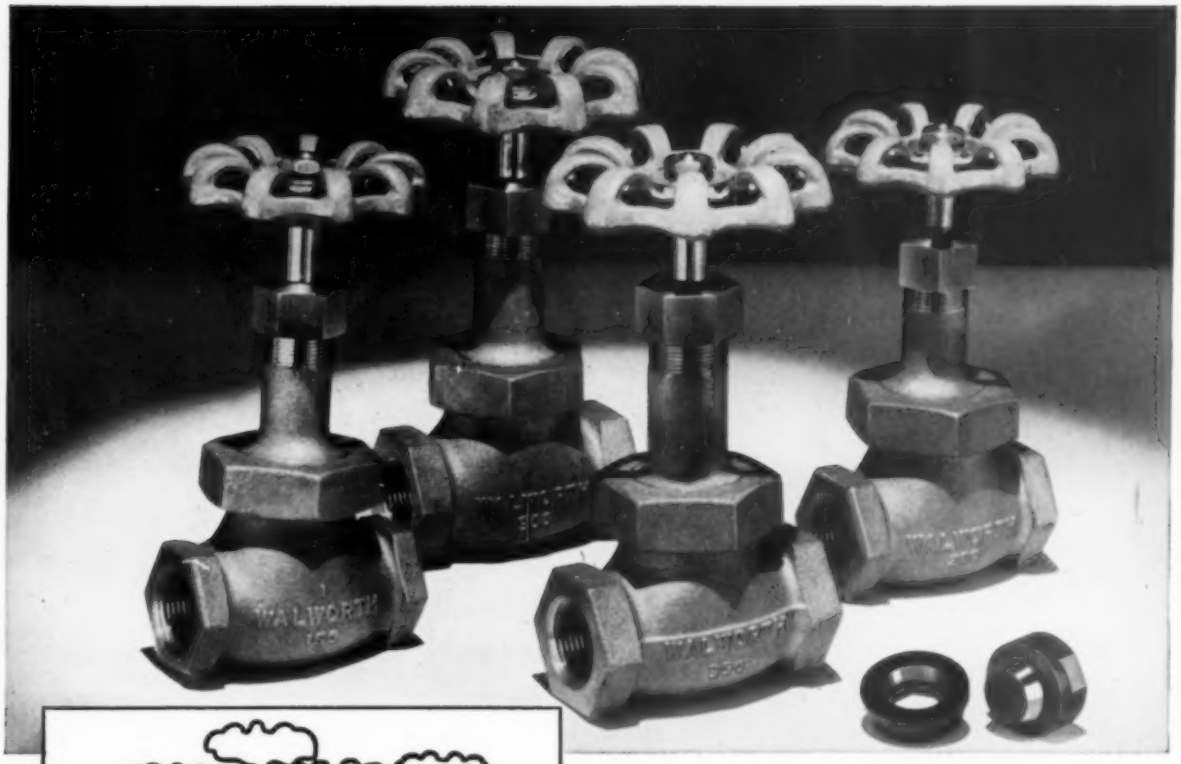
All bearings operate at some temperature above that of the surrounding atmosphere, unless cooled. Heat is generated within the bearing due to rolling friction of the balls or rollers, and by the drag of the race. Some heat may be added by conduction along the pump shaft from the liquid within the pump and from external sources in close proximity.

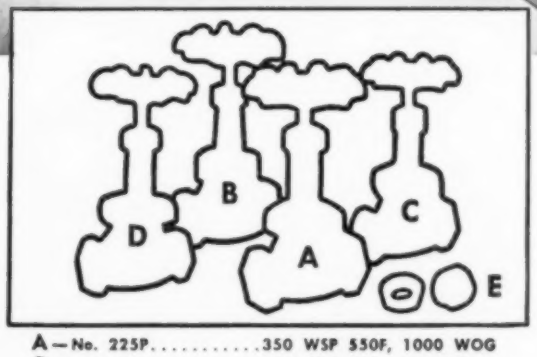
The amount of heat which can be dissipated is dependent on the cooling area of the bearing housing and the temperature and motion of the surrounding air. The net result is a stable operating temperature. Once this temperature has been established, it will remain constant until one or more of the variables changes.

A stable temperature, no matter how hot it may feel to the human hand, is not necessarily an indication of danger so long as it does not exceed the upper limit of the lubricant. The temperature should be established accurately by thermometer and recorded in a convenient location.

A pronounced *increase* in temperature is an indication of danger and a signal to investigate. One shot of grease should be added to the bearing, but if this does not reduce the temperature immediately, no additional grease should be added. The unit should be checked for unnecessary loads, such as coupling misalignment, or improper packing adjustment.

A temperature increase may not be an indication of impending bearing failure or excessive load, but could be due entirely to an increase in temperature of the liquid being pumped, or to an increase in the surrounding temperature during





A — No. 225P.....350 WSP 550F, 1000 WOG
B — No. 260P.....300 WSP 550F, 600 WOG
C — No. 245P.....200 WSP 550F, 400 WOG
D — No. 237P.....150 WSP 500F, 300 WOG
E — "500 Brinell" Stainless Steel Plug Type Seat and Disc

Walworth offers four lines of Bronze Globe Valves with stainless steel, plug-type seats and discs. Advantages of these valves include:

• **Stainless Steel Plug-Type Seats and Discs,** heat-treated to a minimum of 500 Brinell hardness reduces wire-drawing to a minimum. Seats and Discs are machined and fitted simultaneously, assuring perfect mating.

• **Deep Stuffing Boxes with Glands** are fitted with reinforced, molded packing. Valves can be repacked under pressure when fully opened.

For Longer Bronze Valve Life . . .

"500 BRINELL" PLUG-TYPE STAINLESS STEEL SEATS AND DISCS

150 lb. 200 lb. 300 lb. 350 lb.

• **Oversize Stems,** made of high tensile strength silicon-bronze, assure long life.

• **Rugged Body Hexes,** are flat on top; do not interfere with wrench gripping body-to-bonnet union ring connection.

• **Bodies,** made of Composition M bronze (ASTM B61), have ample wall thickness to provide high safety factor.

• **Patented Handwheels** are air-cooled and designed with a "finger-fit grip." Makes turning easy even when wearing greasy gloves.

• **Identification Plates** secured by lock-washer under stem nut, show Figure Number of valves and make re-ordering sure and easy.

FOR COMPLETE INFORMATION, SEE YOUR WALWORTH DISTRIBUTOR OR WRITE FOR ILLUSTRATED CIRCULAR

WALWORTH

60 East 42nd Street, New York 17, New York

SUBSIDIARIES: ALLOY STEEL PRODUCTS CO. CONOFLOW CORPORATION M & H VALVE & FITTINGS CO.
SOUTHWEST FABRICATING & WELDING CO., INC. WALWORTH COMPANY OF CANADA, LTD.

All the features you asked for make

1956

RM* Medium Transformers

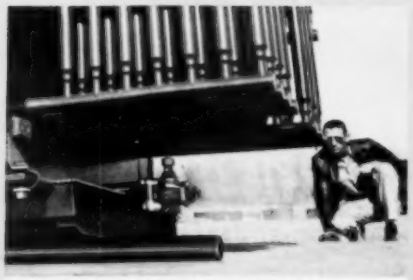
Your Best Buy

For further information on G-E Medium Transformers, contact your nearest G-E Apparatus Sales Office, or write Section 416-6, General Electric Company, Schenectady 5, N. Y.

*Repetitive Manufacture

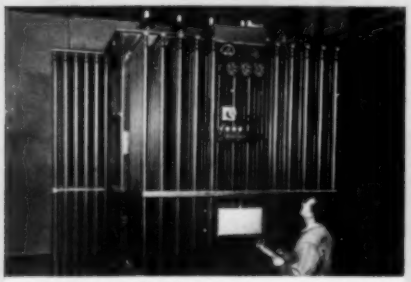
Progress Is Our Most Important Product

GENERAL ELECTRIC



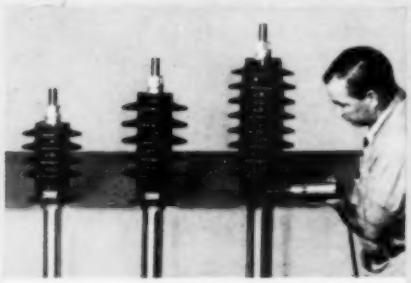
SLED-RUNNER BASE on all G-E RM transformers slides easily or rides smoothly over rollers, makes installation simpler. Wide face on I-beam will not cut rollers.

LIBERAL JACKING SPACE cuts installation time and effort. Minimum of 5½ inches between jackpad and ground provides more-than-adequate clearance for most jacks.

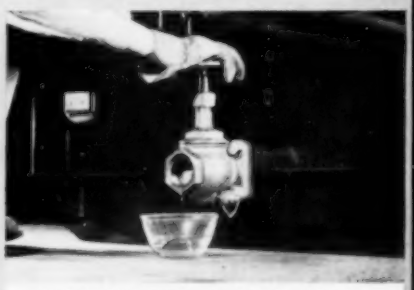


CONTROL CENTER groups all instruments and nameplate in one easy-to-see area; improves visibility, makes readings extra simple. Chances of error are reduced.

PROTECTED ACCESSORIES are recessed behind cooling tubes, sheltered against damage from blows that might be encountered during shipping and installation.

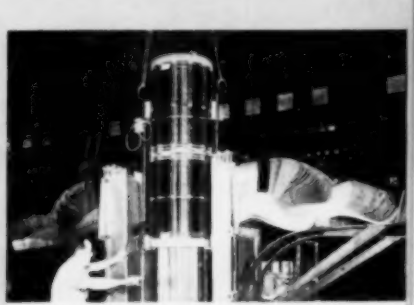


AMERICAN STANDARD BUSHINGS, used on all General Electric Repetitive Manufacture Medium Transformers, enable you to reduce your bushing inventories.



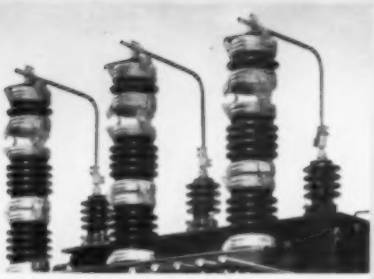
FULL DRAIN permits complete filtration, removes worst bottom oil. Sampling is more accurate, since sample is drawn from region of greatest contamination.

FORMEX* insulation is extremely rugged, has phenomenally high dielectric strength. Permits more compact, lighter RM transformers. *Reg. Trade-mark G.E. Co.



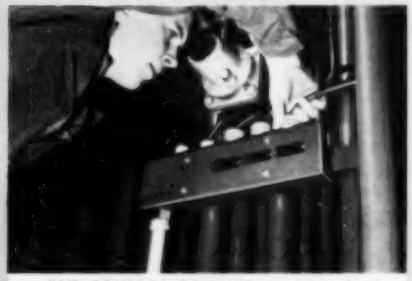
PRE-FORMED CORE, used in single-phase RM medium transformers, reduces core losses since magnetic flux path follows grain in core laminations, even at corners.

VENTILATED BASE permits free air circulation, helps prevent moisture from condensing under transformer, minimizes rusting and corrosion in this hard-to-reach area.



PRE-FITTED CONNECTORS between bushings and G-E Magne-valve lightning arresters simplify field installation, give better lightning protection.

REVERSIBLE JUNCTION BOX readily adapts to overhead or underground system, simplifies ordering and interchangeability, provides additional flexibility.



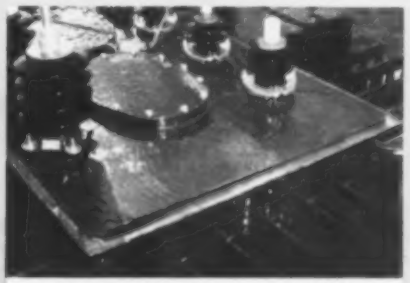
ONE CONTROL CONDUIT simplifies field wiring of accessories and controls. Connections for entire transformer are made to a single terminal board, shown above.

TILTED INDICATORS. Where control center group is sufficiently high above ground, indicators are tilted at proper angle to make instrument reading easier, more accurate.

CONDUITS AND FITTINGS for all control wiring are weather-tight, can be field assembled in minutes without cutting threads. Cover plate gasket is re-usable Nitrile.

NITRILE GASKETS resist weathering, seal without adhesives; no chipping required for removal. Re-usable again and again, they permit reduction of gasket inventories.

SUPER MELAGLYP FINISH saves up to two repaintings, is longer lasting in corrosive atmospheres. Metal is specially prepared for better adhesion, more uniform coating.



DOMED COVERS let water run off, help prevent dirt and rust from accumulating. Flanges around openings prevent foreign matter or moisture from rolling into tank.

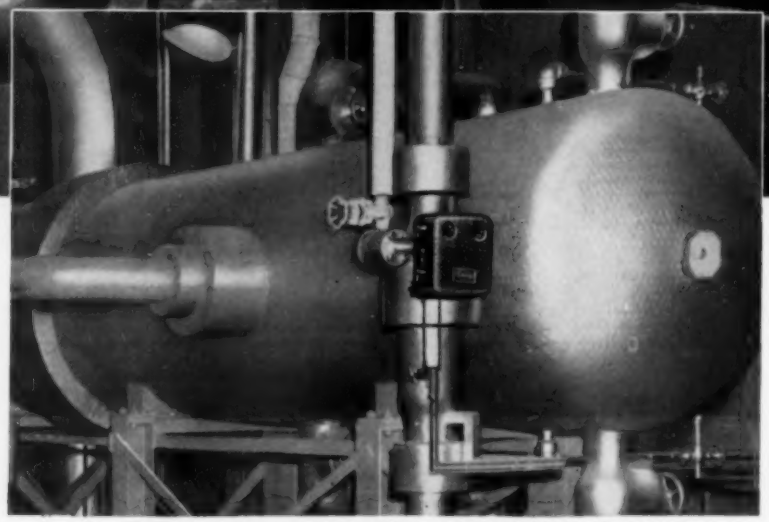
SPRAY-ON PAINT, provided with every RM transformer, permits touching up of spots chipped or scraped during shipment or installation, before rust gets foothold.

WEDGE-TYPE TAP CHANGERS have rugged self-aligning contacts with wedging action to assure line contact. They can carry transformer's full-rated short-circuit current.

LARGER MANHOLES, introduced this year, mean easier accessibility to interior; allow easier and more accurate inspections. Even a husky man has plenty of room.

GENERAL ELECTRIC

These Masoneilan 12000 Series Liquid Level Controllers are being used for normal and interface level control on a gas dehydration unit.



This is one of the versatile 12000 Series Liquid Level Controllers on a heat exchanger in a power plant installation.

In Masoneilan 12000 Series Liquid Level Controls . . .

Five-Point Versatility Solves Processing and Power Plant Control Problems

Here, in one group of related designs, is a completely versatile and adaptable series of liquid level controllers. They offer a one-source solution to the majority of level control problems with flow and storage of liquids in processing and power plant systems. These range, rating and material specifications, and the flexibility in mountings and control types presented with the photographs below demonstrate this important Mason-Neilan advantage . . .

Wide Selection of Ranges — standard ranges include 14″, 32″, 48″, 60″, 72″, 84″, 96″, 108″ and 120″. Ranges with even longer spans can be supplied.

Wide Selection of Pressure Ratings — In the shorter level ranges, standard ratings are from Class 125 ASA in iron to 2500 lb ASA in carbon steel; in all ranges from 150 lb to 600 lb ASA in carbon steel. Under temperatures up to 100° F steel ratings may go as high as 10,000 lb.

Wide Selection of Materials — to meet all usual conditions, a variety of materials is available:

For displacer chambers — iron, carbon steel, bronze, carbon molybdenum, chrome molybdenum, stainless steel, Monel, etc.

For displacers — Type 304 and Type 316 stainless steel, Monel, Hastelloy B or C, Durimet 20, copper and solid Teflon.

For torque tube subassemblies — Inconel, Type 316 stainless steel, K-Monel, Hastelloy B or C, nickel, phosphor bronze, Durimet 20, etc.

There are Masoneilan 12000 Series models for a multiplicity of applications . . . industry's widest selection of liquid level controllers. Look to Mason-Neilan to answer *your* problem. Write for catalog.

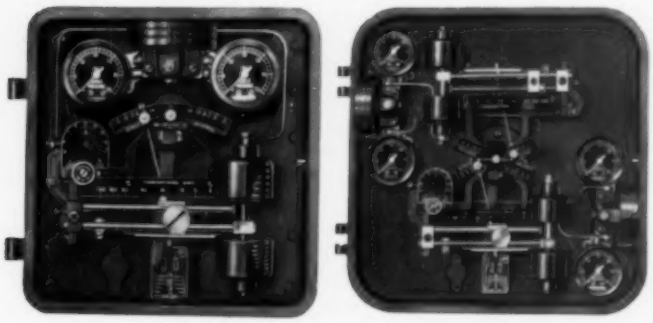
MASONEILAN

MASON-NEILAN

Division of Worthington Corporation

35 NAHATAN STREET, NORWOOD, MASSACHUSETTS

Sales Offices or Distributors in the Following Cities: New York Syracuse • Chicago • St. Louis • Tulsa • Philadelphia • Houston Pittsburgh • Atlanta • Cleveland • Cincinnati • Livonia • San Francisco • Boise • Louisville • Salt Lake City • El Paso Albuquerque • Odessa • Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham • New Orleans Dallas • Seattle • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto



Choice of Control Types

The basic instrument is a proportional controller, left above. In addition, proportional-reset and differential-gap types are available; and pneumatic set may be added for remote pneumatic adjustment of the set-point. Or the instrument may be a pneumatic transmitter instead of a controller. Also, any combination of controllers, or a controller and transmitter, right above, may be included in a single (larger) case and actuated by a common torque tube.

Choice of Mountings

A variety of external mounting types with screwed or flanged connections, plus flanged types for mounting directly on the vessel, provide flexibility in meeting vessel requirements. The instrument may be mounted to right or left of displacer. The chamber types may have a mid-flange for field orientation. Top and bottom flanged connection shown at right.

the warm summer months. Heat transfer due to increased liquid temperature can be minimized by connection of a quenching gland with cold water from the plant water supply line.

Bearing temperatures are frequently increased by lubrication practices. Excessive or over-greasing which results in complete packing of the bearing shell with grease greatly increases the resistance to rotation and the amount of heat generated. Removal of excessive grease from the bearing housing will lower the bearing temperature considerably.

Most pumps handling hot liquids are equipped with quenching glands and water cooled bearings so that the actual operating temperature within the bearing may be lower than the ambient temperature of the surrounding air.

High temperature greases should not be used with water cooled bearings as poor grease fluidity and inadequate lubrication may likely result.

Occasionally when pumps are first started the bearings seem to run extremely hot. This high temperature is frequently caused by the grease seals, not the bearings. As soon as the seals are seated the temperature will drop to a normal level.

Courtesy Goulds Pumps, Inc.

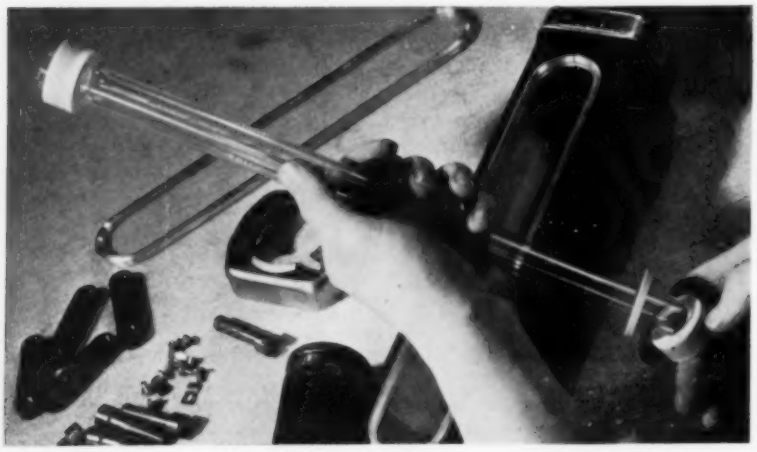
Silicone Rubber Resists Deterioration

THE INSTRUMENT department of a new large chemical plant was suddenly flooded with complaints about leakage around liquid flow meters. Handling reactive chemicals and hot mineral oils, the meters were turned in by the bushel after a few hours or, at best, a few days of service. Failure was due to rapid deterioration of the natural rubber gland packing used to seal the glass sight tubes.

Extra men working full time were unable to fit new glands rapidly enough to keep up with the failure rate. In desperation the instrument department tried other gasketing materials including synthetic rubber, cork, asbestos and fluorocarbon plastics, both shredded and impregnated into asbestos. None of them were able to stem the tide of leaking flow meters.

Then they tried seals fabricated of Silastic, the Dow Corning silicone rubber. Leakage stopped immediately. The Silastic seals tended to swell in contact with the hot and reactive chemicals, but that simply made the seal tighter without breaking the tubing.

Service life was so satisfactory, installation so easy, and maintenance cost so low that Silastic seals were specified for all of about a thousand flow meters in the plant except for those handling cold water or gas. In services ranging from caustic to acid, there has been only one failure in six months.



Check Pulleys for Wear Before Replacing V-Belts

WHEN multiple V-belts are replaced because of wear, belt engineers of the Thermoid Company, Trenton, N. J., advise that several points should be observed to obtain good service from the replacement belts. Normally the original belts are selected and, in some cases, installed by the original manufacturer in sets matched for equal length.

When the belts have served their expected life, the sheaves or pulleys will be from one-half to fully worn out, also. All too often, the new replacement belts are installed on badly and unevenly worn pulleys which will drastically reduce the life expectancy of the replacement belts.

The best practice is to replace the pulleys when the belts are replaced. In any case, the pulleys should be examined for roughness in the grooves which will cause excessive wear.

The grooves should be checked for uneven wear. The belts may be matched but not the grooves. To check for uneven groove wear, move the matched belts from groove to groove and test for difference in play. If uneven tension is observed, the pulleys should be replaced.

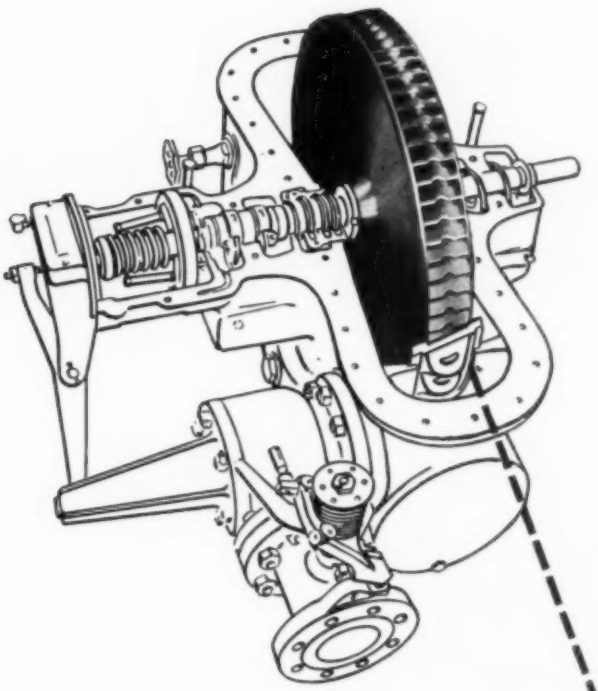
The replacement belts should be of the same type and construction as the original.

In order to assist belt users in obtaining matched sets, Thermoid belts are marked with symbols to show the variation from the nominal length. The marks range from about 38 to 62. A belt marked No. 50 is the nominal length. One marked No. 51 is .1" over nominal, No. 52 is .2" over nominal. No. 49 is .1" under nominal and so on.

Large belt users holding many belts in inventory should also be careful to use belts with approximately the same storage life under the same storage conditions to obtain matched sets as well as observing the match marks.

See Reader Service Card—P. 17

Work Horse of Industry..since 1906



The Terry Steam Turbine Company was incorporated in 1906 to manufacture *a workable and efficient prime mover that would operate with minimum maintenance.* This prime mover was the solid-wheel turbine, which had been invented by Edward Clinton Terry a few years before.

Although maintenance practice has improved vastly since then, the demand for the turbine has multiplied many times. *Rising maintenance costs have actually increased the need for trouble-free operation.*

Today, there are more Terry solid-wheel turbines in operation, and there are more built each year, than ever before. The explanation is simple.

Here is a turbine with a virtually indestructible wheel. Made of a single forging of special composition steel, there are no separate parts to loosen or work out. As the only function of the blades is to form a series of pockets, any wear which may occur does not materially affect horsepower or efficiency.

Blades will not foul. They have large clearances and are further protected by the projecting rims at the sides of the wheel. As the side clearances are also very large, end play can do no harm.

These are a few of the reasons why the Terry solid wheel turbine has been the *work horse of industry – since 1906.* For the full story, send for a copy of Bulletin S-116.

THE TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD 1, CONN.

TERRY

1906 was the year this turbine was built in Terry's plant. It is believed to be one of the first small direct-connected turbines built for commercial use in the United States.

TT-1203

BETTER ELEVATORING IS

No installation is too **large**

FREIGHT ELEVATORS for loads ranging from 40,000 pounds down to 2,500 pounds.
Booklet B-705 describes Otis Heavy Duty Freight Elevators.
Booklet A-414 describes Otis Plunger Electric Freight Elevators.
Booklet A-382 describes all Otis Vertical Transportation equipment and services.

FREIGHT ELEVATORS for loads ranging from 2,500 down to 1,500 pounds.
Booklet B-720 describes Otis Self-Supporting Light Duty Freight Elevators.

We'll be glad to send you any or all of the above booklets.

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ELECTRIC • PLUNGER ELECTRIC
freight elevators
LIGHT, GENERAL, AND HEAVY DUTY
ELECTRIC DUMBWAITERS

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.

No
installation
is too

small

THE BUSINESS OF OTIS

OFFICES IN 294 CITIES ACROSS THE UNITED STATES AND CANADA

News for the South & Southwest (Continued)

(Starts on Page 8)

Yale & Towne — Baltimore

The Yale & Towne Manufacturing Company has announced the expansion of sales and services facilities and the appointment of two new salesmen in the Baltimore territory.

The **Baltimore sub-branch office,** headed by **David C. Dewey,** is located at 1115 E. 30th Street. Improvements have been completed at the location to permit more extensive service activities and increased service parts inventory.

Joining the Baltimore staff are **John J. Nagle, Jr.** and **Fred W. Hopkins.**

Air Reduction—Kentucky

Air Reduction Sales Company's new producing plant at **Calvert City, Kentucky,** is scheduled for completion by the middle of the year. This is the third Air Reduction plant to be built in Calvert City. The first was the National Carbide division's calcium carbide and acetylene generating plant which supplies pipeline acetylene to three customer plants. The Air Reduction Chemical Company division is just completing a vinyl acetate monomer plant in this same area. Air Reduction acquired 1500 acres of land in Calvert City for the purpose of making plant sites available to customers.

Addition to Glidden's Atlanta Facilities

A modern, newly-erected plant for the expanded production of industrial paint products has been added to the **Atlanta, Georgia** manufacturing facilities of **The Glidden Company.**

Constructed and equipped at a cost of $350,000, the two-story, masonry and reinforced concrete structure completes the second addition to Glidden's Atlanta plant since 1953. The new producing unit contains 30,000 sq ft of sprinkler-protected manufacturing space.

Highly automated, the new plant utilizes a manufacturing method that combines gravity flow and a pump-pipe-line system. Production units include grinding, mixing, straining and filling equipment of the most modern design. Ample storage tank facilities for varnishes and solvents have been installed with each tank equipped with remote controls.

Republic Buys Swartwout's Line of Steam Specialties

Republic Flow Meters Co., Chicago, a pioneer and leader in the field of industrial instruments and controls, has announced the purchase of the power plant and equipment division of the **Swartwout Co.** of Cleveland.

Republic will take over the engineering, manufacture, sales, and service of the Swartwout line of desuperheaters, regulating valves, feed-water regulators, pump governors and air-operated controls. Changeover is expected to be completed by March 1.

Expansion Completed at Glasgow, Virginia, Carpet Plant of James Lees and Sons Co.

Aerial view of the famous carpet manufacturing plant of **James Lees & Sons Company** at **Glasgow, Va.,** shows new extension to spinning mill at right. Expansion, designed and engineered by The **Kuljian Corporation** of Philadelphia, more than doubles the plant capacity of carpet yarn.

The new plant is considered to be one of the most modern spinning mills in the textile industry, equipped with new machinery embodying ingenious features recently developed. Other new facilities include a blending room and a warehouse. Complete heating, air conditioning and ventilation equipment were provided in order to maintain comfortable working conditions as well as to maintain the exacting atmospheric conditions required for the manufacture of high grade yarn. The air conditioning installation, one of the largest central plant systems in the United States, uses for refrigeration two 215-ton centrifugal compressors.

To take care of expanded operations, the boiler house was also enlarged by installing an additional boiler with the necessary equipment.

(*Continued on page* 86)

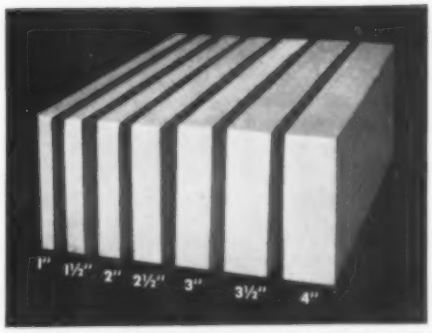
Specify J-M Superex, industry's favorite block insulation

Made from diatomaceous silica and asbestos for all temperatures to 1900F

YOU'LL ENJOY *greater insulation savings* with Superex®. Its unique combination of low conductivity and outstanding resistance to high temperatures provides greater operating efficiency and longer maintenance-free service. That's why Superex is the leading block insulation for furnace work.

Light and easy to work. Superex withstands temperatures to 1900F indefinitely with negligible loss of efficiency and is so strong that it compresses only ⅛ inch under 6 tons' pressure per square foot. Its light weight, excellent working properties and availability in large blocks mean quick, easy, low-cost installation.

For high temperature equipment. Since its introduction in 1927, Superex has received enthusiastic acceptance. Today it economically insulates 90% of the country's hot blast stoves. Other high temperature equipment where Superex has proved its superior performance include most types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, regenerators, kilns, roasters, high-temperature mains, flues and stacks.



Saves waste—Superex comes in 7 standard thicknesses from 1" to 4". Other sizes available on order.

For further information on Superex, write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ont.

JM PRODUCTS

Johns-Manville *first-in* INSULATION

MATERIALS · ENGINEERING · APPLICATION

Foxboro Expands Sales Activities — Southeast

Five new sales office appointments have been announced by **The Foxboro Company,** Foxboro, Mass., augmenting instrument sales engineering service in the growing industrial areas of the Southeast.

Mr. E. W. Prendergast, formerly branch manager at Atlanta, has been made **regional manager of the Southeast territory.** Joining the company in 1947, Mr. Prendergast served as industrial engineer with the Atlanta branch and became manager in 1952. In his new assignment he directs Foxboro instrument sales activities in Mississippi, Alabama, Georgia, Florida and sections of Arkansas, Tennessee, North Carolina and South Carolina.

In other changes, **R. F. Sutton** has been transferred from the Pittsburgh sales office to **Pensacola, Florida** where he is serving as industrial engineer. Also assigned were industrial engineers **F. J. Stevens, Jr.** who will work out of the Lakeland, Fla., branch, **H. C. Craig,** transferring from Gray, Me., to Jacksonville as branch manager, and **L. C. Estes,** Atlanta branch.

Elsewhere in the South, **G. W. Reed, Jr.,** has been named manager of Foxboro's **New Orleans** office and **J. K. Younkins,** manager at **Charleston, W. Va.** Joining the company as industrial engineers were **W. H. Rhyne, T. A. Jones** and **M. N. Walker** who will be assigned to the **Chattanooga, Charlotte** and **Knoxville** offices respectively.

Stone & Webster V.P.

Harold D. Beebe has been elected a vice-president of **Stone & Webster Service Corporation.**

Mr. Beebe has been with Stone & Webster Service Corporation since 1950 and head of its electric department since 1954. He formerly was with the Tampa Electric Company, Tampa, Fla., as general superintendent.

Dravo — San Antonio

The Alamo Plumbing Supply Company, San Antonio, Texas, has been appointed a distributor of **Dravo** heating equipment for that marketing area. Dravo Corporation, located in Pittsburgh, Pa., is one of the world's largest manufacturers of industrial and commercial warm air space heating and process drying equipment.

The San Antonio firm will sell Dravo's complete line of gas and oil fired units. These include the Counterflo, Paraflo and Gas-Fired suspended type heater models, covering a range of capacities from 68,000 to 2,000,000 Btu per hour output.

Ebasco Vice Presidents

Ebasco Service Incorporated — engineering, construction and business consulting firm has announced that **E. K. Wilkins** is now vice president in charge of construction and **W. H. Colquhoun** is vice president in charge of engineering.

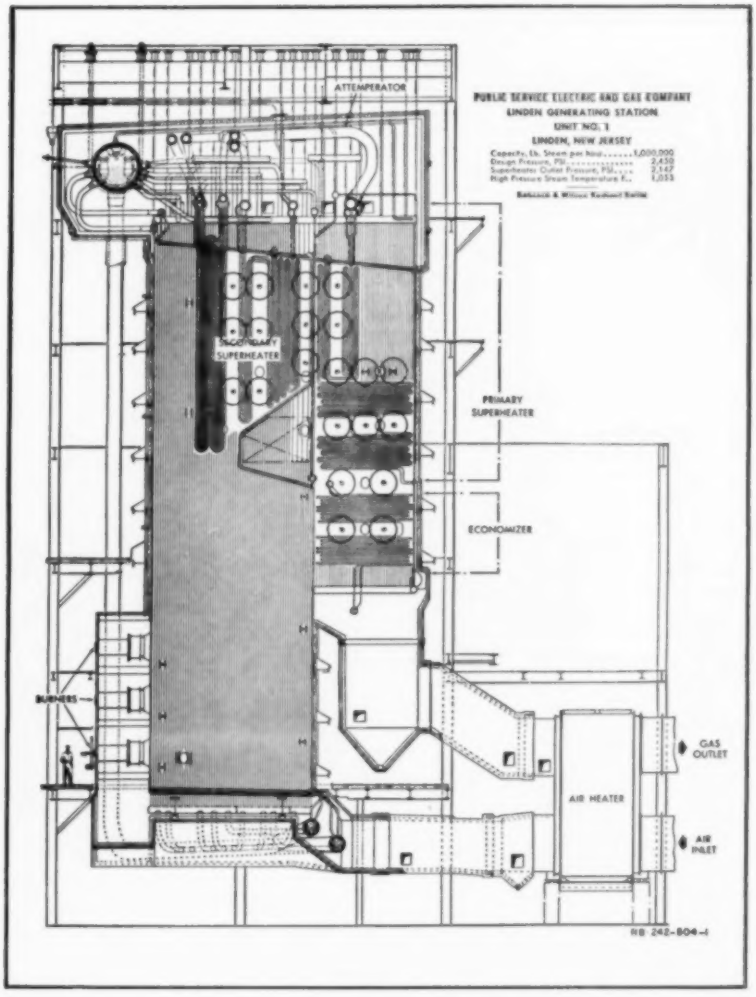
Automatic Dispatching at Kansas City Power & Light Affords Fuel Savings

Vice President **J. A. Keeth** (center) of the **Kansas City Power & Light Company** watches **Dr. L. K. Kirchmayer,** General Electric analytical engineer, run through simple steps for operating G-E's new automatic dispatching system in the utility's Northeast Station control room. At left is **H. S. Day,** specialty instrument sales manager with the Company's Instrument Department at Lynn, Mass., the equipment manufacturers.

Officials of Kansas City Power and Light Company state that they are convinced that the apparatus is the proper approach to control and dispatching problems, and that fuel savings realized from this new system during its first year of operation will be in the order of its purchase price.

The system, developed by General Electric engineers, automatically controls both load and frequency and distributes load among machines so that power is generated at minimum cost. With ADS, the time-consuming jobs of schedule pre-calculation and manual execution of schedules are completely eliminated.

It's Vulcan Automatic-Sequential at Linden Generating Station



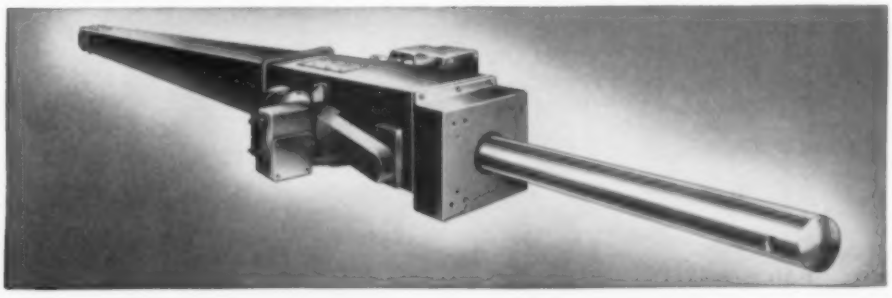
Two of the retractable soot blowers at Sewaren Generating Station are Vulcan T-30 Long Retractables with 33 feet 2½ inches travel, the longest soot blowers built at the time they were installed. Their performance opened the door for a single installation on the new and larger twin-furnace boilers, with substantial overall savings to the user. It was a prime factor in the selection of Vulcan Automatic-Sequential Soot Blowing for the new Linden Generating Station of Public Service Electric and Gas Company.

This semi-outdoor station will have four Babcock & Wilcox radiant boilers with pressurized furnaces. Three of them—each with capacity of 1,000,000 pph at 2147 psig and 1055 F—make up Unit 1. Unit 2, a twin-furnace boiler with reheat, is rated at 1,900,000 pph at 2373 psig and 1100/1050 F.

The Vulcan T-30 Long Retractables to be installed on these units will have travels up to 33 feet. The T-30 Half-Tracts will travel up to 16½ feet. Blowing medium: air. Drive: electric.

Effective, economical boiler cleaning is assured with the Vulcan Automatic-Sequential System. Any blower can be cut in or out of the automatic sequence—or blown individually from the panel. Control is at the operator's finger tips. And each blower reports its operation back to the central panel.

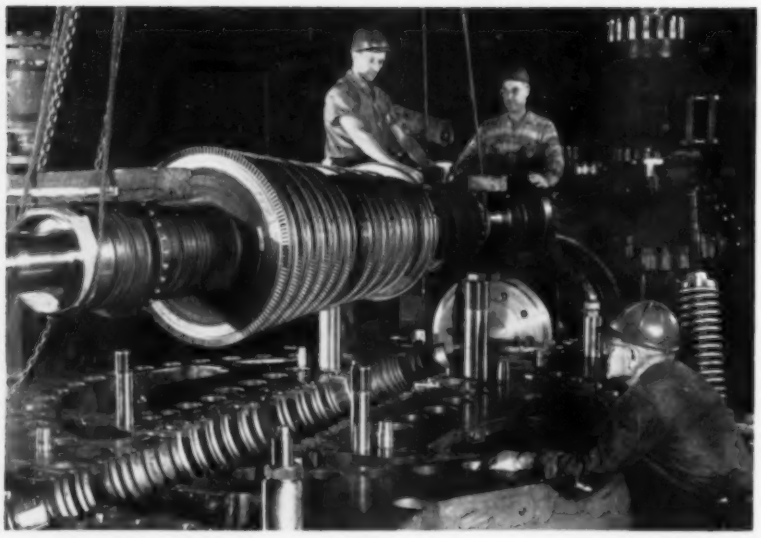
No matter what size your boilers —whether power or process—depend on Vulcan for optimum cleaning results.



Vulcan T-30 Long Retractable Soot Blowers have been built for travels in excess of 35 feet to reach the most remote passes of steam generators. They are designed and built for long service life under the most rugged operating conditions.

COPES-VULCAN DIVISION
BLAW-KNOX COMPANY
ERIE 4, PENNSYLVANIA

50th Anniversary BLAW-KNOX 1906-1956



Supercritical Pressure Generator Begins Test

Factory tests for the world's first commercial supercritical pressure steam turbine-generator unit have begun at **General Electric Company's** Large Steam Turbine-Generator Department plant in **Schenectady, N. Y.**

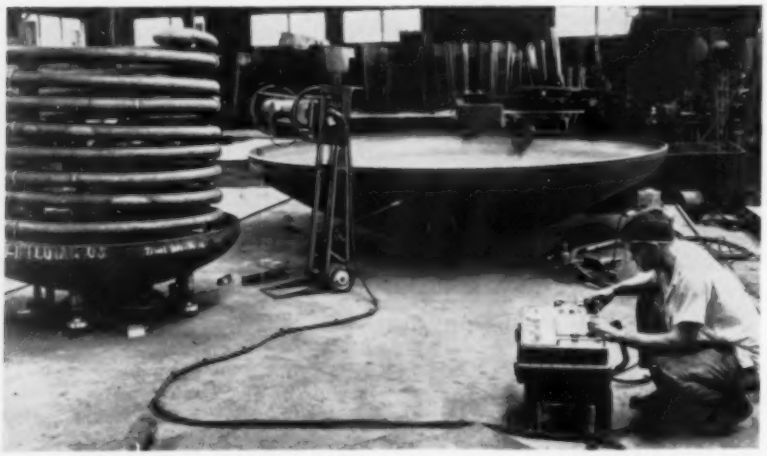
Workmen are seen above leveling the seven-ton supercritical pressure element turbine rotor prior to lowering it into the turbine shell.

The 125,000-kw unit will operate at an initial steam pressure of 4,500 psig at a temperature of 1,150 F. The highest steam pressure used by turbines now in service in the world is 2,400 psig.

This steam turbine-generator unit is scheduled for installation this year at the **Philo, Ohio,** power station of the **Ohio Power Company** of the American Gas and Electric System.

Inspection of Stainless Steel Coils

Confirming soundness of welds on internal stainless steel coil for pressure vessel by Andrex portable x-ray at **McJunkin Corp., Charleston, West Virginia.** Operating from a shop caddy, this portable x-ray saves 50% of the inspection time required by former x-ray procedures. Set-up time is reduced 90%. Only five minutes is required for each weld on this ⅝-inch thick pipe. The Andrex portable unit furnished by **Holger Andreason, Inc.,** has been in operation here for 2½ years without requiring service.



Georgia Activities in Atomic-Powered Aircraft

Atom-powered airplanes have zoomed into the No. 1 spot in Georgia's potential industrial future in a series of rapid developments which have mushroomed like the cloud from an A-bomb.

Three announcements — two by **Lockheed Aircraft's Georgia Division** at Marietta and one by Georgia Governor Marvin Griffin — have tiggered the explosion of intense interest in harnessing the energy of the atom to an aerial vehicle:

1. The U. S. Air Force and Lockheed-Georgia announced in early April that an immediate start would be made on a giant nuclear aircraft testing and research facility near **Dawsonville, Ga. W. R. Rhoads,** chief staff engineer of Lockhead Aircraft's Georgia Division at Marietta, has been appointed director. Reactors and laboratories of the multi-million-dollar installation will be located on a 16-sq-mile tract in the foothills of the Blue Ridge mountains. Some 500 scientists, engineers and technicians will operate the facility which is planned.

2. Gov. Griffin of Georgia quickly followed this with disclosure of a $300,000 appropriation to the **Georgia Institute of Technology** in **Atlanta** for a program of education and research in nuclear science and said he would ask the next session of the General Assembly of Georgia for funds, estimated at approximately $3 million, for a nuclear reactor for use by Georgia Tech. The reactor would be "big enough for industrial and commercial research uses."

3. Robert E. Gross, president and board chairman of Lockheed, further filled in the A-plane picture in Georgia by saying that his company "plans to spend many millions of dollars" on facilities and equipment to adapt the Georgia operation for atomic aircraft work.

W. R. Rhoads

American Cyanamid burns coal the modern way, saves $100,000 a year

Increased production demanded additional steam in American Cyanamid's plant at Bridgeville, Pa. Management decided to analyze its power system with an eye to improving operating economy and efficiency.

The decision was *modernization,* with emphasis on more efficient distribution of steam, generated by burning pulverized coal. New steam traps were installed, waste steam was utilized, condensate was recovered, piping was simplified, a thorough system of maintenance and repair was instituted. The sound thinking behind this unusual program—unusual in that power system economies took place *after* steam generation—today rewards American Cyanamid with a savings of $100,000 a year!

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

NATIONAL COAL ASSOCIATION
Southern Building • Washington 5, D. C.

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

"... this program will do a tremendous job"

"I personally believe that the Live Better Elecrically program is going to increase the over-all interest of the public in the benefits our industry has to offer. This unquestionably will stimulate the sale of appliances and load growth."

Walter McKie,
General Sales Manager,
Rochester Gas and Electric Corporation

How Rochester Gas and Electric is building with LIVE BETTER...

Today over 200 electric utility companies throughout the country are actively participating in the LIVE BETTER . . . *Electrically* program. Here's how one combination utility – Rochester Gas and Electric – is using this long-range, industry-wide promotion to get maximum results for its own residential load-building efforts.

Every electrical promotional activity at RG&E is being launched under the banner of "LIVE BETTER . . . *Electrically*." This theme dominates and unifies RG&E's dealer program, adequate-wiring program, home-appliance program, farm program, architects and builders promotion, home-economics program, model-home promotion, advertising, and Electrical Association activity.

Important to the success of this far-flung activity is the liberal use made of promotional materials available from LIVE BETTER . . . *Electrically*. RG&E is distributing copies of the 72-page consumer idea book, sending copies of "How to Help Home Owners LIVE BETTER . . . *Electrically*" to its trade allies, using banners, streamers, counter cards, mats with the slogan and emblem.

These materials are available to every utility company in America. The impact of national LIVE BETTER . . . *Electrically* consumer advertising in magazines and network television shows, plus industry-wide trade advertising, helps insure the success of this cooperative effort. Those utilities–like Rochester Gas and Electric–which are working for and getting the cooperation of trade allies in their area will reap the greatest rewards.

Consumer idea book, "New Step-by-Step Ideas to help you LIVE BETTER . . . *Electrically,*" will be offered in RG&E's editorial-style advertisements to run in local newspapers.

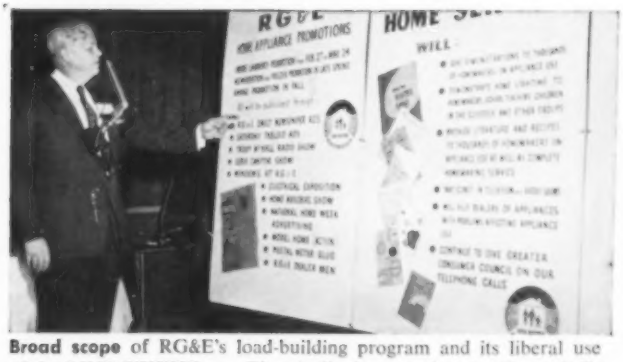
These are signs of Low HOUSEPOWER
HOW TO FREEZE FRESH FRUITS AND VEGETABLES
Why "Sweat Out" another summer
...AIR CONDITION now!

Running headline, "LIVE BETTER... *Electrically,*" provides an "umbrella" theme for pending newspaper advertisements of The Electrical Association of Rochester, Inc. These advertisements will appear every week for 50 weeks.

Home economists in the Home Economics & Lighting Dept. – like Miss Marcia Dowd – tell women's groups of the many ways they can LIVE BETTER . . . *Electrically.*

residential load *Electrically*

LIVE BETTER ELECTRICALLY



Broad scope of RG&E's load-building program and its liberal use of the LIVE BETTER . . . *Electrically* theme and materials are indicated by Assistant General Sales Manager Graydon Curtis.

LIVE BETTER . . . *Electrically* is the theme of the Adequate Wiring Bureau's promotion and appears as the theme of Electrical Exposition. Poster shows how RG&E works with dealers and distributors.

Home-modernizing promotion, of particular interest to architects and builders. This activity, as well as the RG&E Farm Department program, will tie in with the LIVE BETTER . . . *Electrically* campaign.

Appliance exhibits, featuring high-wattage appliances like washers, dryers, automatic water heaters use the LIVE BETTER . . . *Electrically* theme as a prominent identifying and unifying device. This is another example of how RG&E gets maximum mileage out of the program.

At Electrical Exposition, Rochester Gas and Electric exhibit dramatizes the decorative effects homemakers can achieve with lighting – and an illuminated valance-type display spells out the exhibit slogan: "LIVE BETTER . . . *Electrically.*"

Equipment . . . Supplies . . . Methods

FOR FREE INFORMATION — Circle Code Number on Page 17 Return Card

Self-Priming Hand Pump

F-1 A new piston-type, positive-displacement, self-priming hand pump delivers 20 gpm at lower "cost per gallon" than their rotary vane-type hand pumps rated at 10 gpm, according to **Bowser, Inc.,** Fort Wayne, Indiana.

Available as pump only, barrel pump, pedestal pump or with hose and nozzle delivery, the all-corrosion-resistant moving parts make the pump suitable for handling many industrial solvents, lubes, cutting or paint oils, maintenance liquids, etc. Bulletin 3011 gives design features.

Explosion-Proof Motors

F-2 A complete line of explosion-proof motors through NEMA frames 405 and 215 is now being offered by **Sterling Electric Motors, Inc.,** 5401 Telegraph Road, Los Angeles 22, California.

Design meets underwriters requirements for the three most hazardous locations—gaseous, explosive dust, and explosive grain dust. Available in standard, geared, or variable speed models with optional mountings to meet individual requirements. Catalog 189 gives design features.

Internal Dial Caliper

F-3 A new, internal dial caliper, recently introduced by the **Airetool Mfg. Co.,** 328 S. Center St., Springfield, Ohio, is designed for taking direct readings in a fast, accurate measurement of tubes and tube holes in tube sheets.

Caliper is spring loaded for greatest accuracy and is graduated in .001".

The new caliper comes complete, ready for use, and can be obtained in calibration ranges of .400" to .800", .800" to 1.200", 1.200" to 1.600" and 1.600" to 2.000".

Do-It-Yourself Framing Material

F-4 Dexion Slotted Angle being produced by the Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois, is an all-purpose fabricating material. Applications include shelving, racks, conveyor mounts, bins, carts and dollies, machine and belt guards, machine and motor mounts, ladders, scaffolding and tables.

Dexion 225-80 Slotted Angle measures 2¼ x 1½ in. x .080. A wrench (or Dexion Cutter) is the only tool needed for assembly. There are no clips or hooks required. Drilling and welding are unnecessary.

The framing material is 100% reusable. Slotted angle structures can be dismantled quickly and the pieces reused to build other equipment.

A St. Louis, Mo. paint company needed a catwalk to service seven new paint vats. This 39 ft structure was built with Dexion Slotted Angle. Completed catwalk supports a load of 150 lb per sq ft. Structure was built by the plant's regular maintenance crew in only 60 man-hours.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

Electric Metal Nibbler

F-5 High-powered to cut No. 18 gage in mild steel (.058"), a new unit of **Mall Tool Company**, 7725 South Chicago Avenue, Chicago 19, Illinois nibbles metal away, such as aluminum, tin and similar sheet metals, quickly and easily.

It is the ideal tool for scalloping and cutting curves in aluminum. It cuts in a series of punches instead of using a shearing technique. According to the manufacturer, it will effectively service the countless metal nibbling jobs of modern machine shops, maintenance shops and production line work.

This versatile nibbler takes 2500 strokes per minute, with a .16" stroke length. It is powered by a universal-type motor, with spur gears of 34 pitch hardened alloy steel. Lightweight at only 5 and ½ lb, it is expertly balanced, thus allowing the operator a free hand to guide or hold the material being processed.

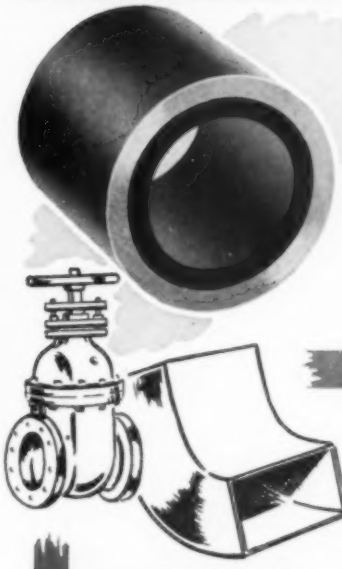
KEEP UP-TO-DATE

- **Ideas**
- **Methods**
- **Equipment**

USE SPI READER SERVICE

See Service Card Pages 17-18

PROTECTION *against* **Corrosion and Abrasion!**



for PIPES... VALVES... TANKS...DUCTS ...VESSELS...etc.

Rubber, Neoprene and Polyvinyl Chloride LININGS & COATINGS

Are you handling acids, bases, salts or other hard-to-handle chemicals or fumes in your production? We coat pipe-lines, tanks, valves, ducts, etc., for longer, more efficient operation. Compounds can be made conductive or non-conductive, soft or hard, suitable for high or low temperature operations.

Long-established Southern Company now offers you speedier service, lower transportation costs, important savings in your maintenance and new installations involving such specialized equipment. Our highly skilled personnel and newest production techniques can increase your plant efficiency.

QUALITY SOLDER SEAL PRODUCTS

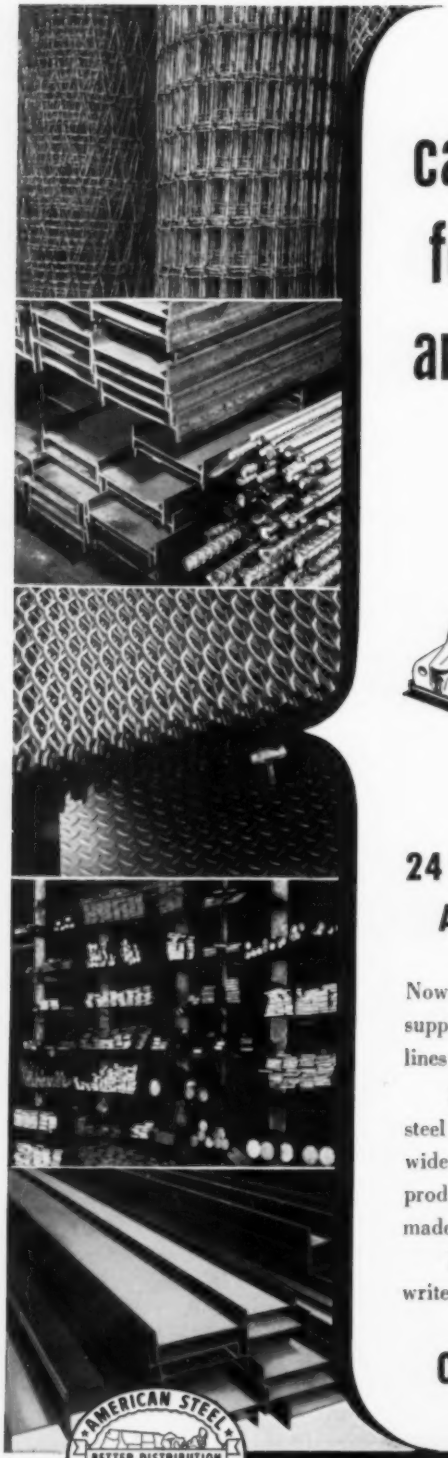
Write, wire or phone for full information or immediate service

RADIATOR SPECIALTY CO.

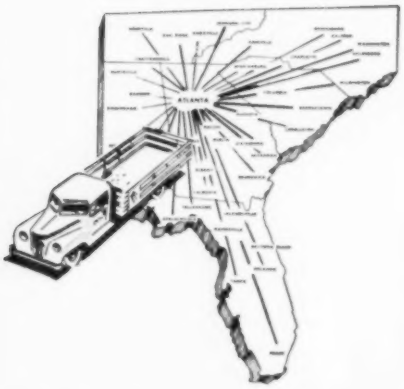
1400 West Independence Blvd. Phone EDison 3-3131

CHARLOTTE, NORTH CAROLINA

2120



call ATLANTIC for STEEL and SERVICE



24 to 48 HOUR DELIVERY
Anywhere in the South

Now our own growing fleet of trucks supplements the vast network of freight lines serving the South from Atlanta.

From one of the South's largest steel warehouses, you can order from a wider variety of steel and aluminum products, knowing that delivery will be made on time.

For steel or aluminum in a hurry, write, wire or telephone—

Call TRinity 5-3451

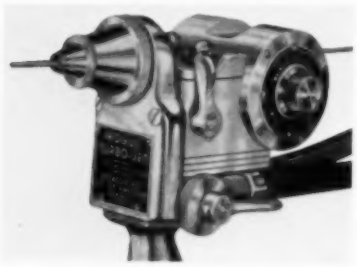
AMERICAN STEEL WAREHOUSE ASSOCIATION BETTER DISTRIBUTION

WAREHOUSE DIVISION
Atlantic Steel Company
14th at Northside Dr., P. O. Box 1714, Atlanta 1, Georgia

Equipment, Supplies & Methods (Continued)

Metallizing Gun

F-6 A new general purpose metallizing gun to handle all metal spraying applications has been developed by the **Metallizing Company of America,** 3520 West Carroll Avenue, Chicago 24, Illinois.



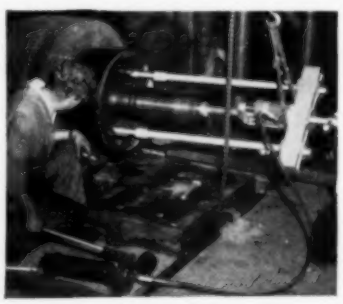
The Turbo-Jet will spray and deposit an extremely dense coating using wires from 20 gauge to 3/16 in. from the highest melting point molybdenum to the softest metals. No changing of worms, gears, or feed rolls.

Applicable for hand as well as tool post operation. Unit weighs only 5 lb. Individual driven dual feed rolls eliminate any possibility of wire slippage through the gun and provides a more positive feed.

Hydraulic Pulling Set

F-7 A new 50 ton Hydraulic Puller Set, recently announced by **Owatonna Tool Company,** 395 Cedar St., Owatonna, Minnesota, provides heavy duty pulling power for maintenance work on large industrial machine tools, turbines, industrial tractors, mining machinery, earth moving and railroad equipment and all other heavy equipment.

The set includes all the basic



items to remove and install gears, bearings, pulleys, sheaves, pinions, sprockets and other tight fitting parts. The set is available with either electric or hand operated pump.

Pulling with hydraulic power is accomplished without distortion to parts while the remote application of hydraulic power eliminates the damage to personnel working on the job.

As many as three to four man-hours can be saved on each pulling job with this new 50 ton hydraulic puller set plus the actual savings in down-time.

Transformer Overload Indicator

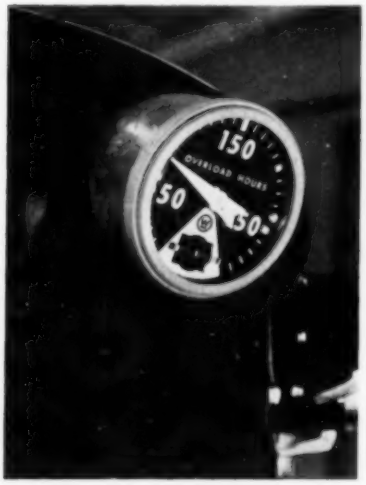
F-8

A new overload indicator (Type TD) for conventional distribution transformers that keeps a permanent and accurate record of overload hours based on copper temperatures is available from **Westinghouse Electric Corporation,** Box 2278, Pittsburgh 30, Pa.

The new indicator aids in prediction of transformer life, gives advance warning for change - out scheduling, and is easy to read from the ground.

The unit consists of three simple parts: a control thermostat that is installed so that it responds directly to copper temperature; a motor or timing mechanism that permanently records the number of overload hours on a dial; and a signal light which serves as an auxiliary warning.

The timing motor and the signal light are supplied by an auxiliary winding that is not exposed to surges.



GOULDS PUMPS, INC., Seneca Falls, New York

Check bulletins you'd like to receive:

☐ Pump Fundamentals. A brief outline of the characteristics, operation and criteria for selecting reciprocating, rotary, and centrifugal pumps.

☐ 710.1 "Close-cupld" Centrifugal Pumps.

☐ 721.6 Single-stage Double-suction Pumps.

☐ 725.4 Centrifugal Chemical Pumps.

☐ 726.1 Vertical Centrifugal Pumps.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

How to buy a better pump

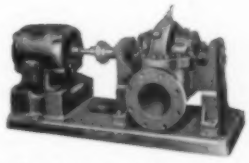
When you have to choose from dozens of pumps of different types and brands, it's hard to tell which will work best for you at the least cost.

However, when you know what to look for and how to look, you can match a pump to your needs almost exactly.

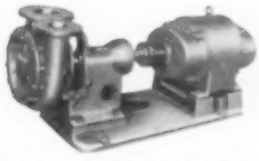
Just five of hundreds of bulletins we've prepared to help you buy wisely and well are offered above. Send for them and use them when you need a general purpose pump.

When you have a particular application in mind, write us the essentials. We'll be glad to advise you on the pump or pumps that will work best for your purpose.

4 general purpose pumps



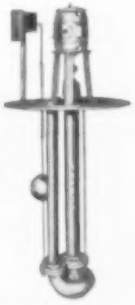
1. For large capacity pumping, the Goulds Fig. 3405. 33 sizes with capacities up to 6400 GPM; heads to 425 ft. Send for Bulletin 721.6.



2. For economical handling of hot, corrosive or abrasive liquids, the Goulds Fig. 3715 stainless steel pump. 9 sizes with capacities up to 720 GPM; heads to 200 ft. Send for Bulletin 725.4.

3. For use where space is at a premium, the Goulds Fig. 3655 "close-cupld" pump. 20 sizes with capacities up to 2000 GPM; heads to 400 ft. Send for Bulletin 710.1.

4. A submerged-type sump pump for depths of 3 to 20 ft., the Goulds Fig. 3047. 4 sizes with capacities from 10 to 650 GPM; heads up to 65 ft. Send for Bulletin 726.1.



MEMBER HYDRAULIC INSTITUTE

Goulds PUMPS INC. Seneca Falls New York

SALES OFFICES: Atlanta • Boston • Chicago • Houston • New York • Philadelphia • Pittsburgh • Tulsa

Increase your productivity and reduce overhead costs with smooth, *dependable* Roper Rotary Pumps. The two models illustrated (of the 3600 Series so widely used in virtually every industry) are naturals for transferring fats, oils, sirups, and similar products. Model MAHB is best suited for stationary equipment. Model HBRV is Roper's outstanding general purpose pump that lends itself to tank truck installations. The Roper principle of two moving parts — equal size gears — promotes high efficiency and holds maintenance problems to a minimum. Available in standard fitted, all iron and bronze fitted construction to suit your needs. Series 3600 pumps available in sizes 40-300 G.P.M. — pressures to 60 P.S.I.

ROPER
Rotary Pumps

GEO. D. ROPER CORPORATION
436 BLACKHAWK PARK AVE. ROCKFORD, ILL.

Equipment, Supplies & Methods (Continued)

Oil Fog Principle in Centralized Lubrication

F-9 **The C. A. Norgren Co.**, 3400 So. Elati St., Englewood, Colorado is marketing their new Micro-Fog Lubro-Control Unit which automatically creates a finely divided air-borne oil fog. This fog can be uniformly distributed through complex piping systems to multiple lubrication points. A single unit can completely lubricate even the largest machines — up to 1000 bearing-inches.

Two pressure switches and a float-controlled switch are provided for connection to a control panel, if desired, to actuate an automatic alarm system or controls when air pressure fails, when excessive pressure develops in the oil reservoir, or when the oil supply needs replenishing.

The unit is small, compact and complete, measuring only 12" x 11" x 9". It contains all necessary controls plus a 2 gallon oil reservoir—enough oil for 12 hours lubrication at maximum Micro-Fog output. This unit eliminates the need for multiple installations of many smaller lubricators which would involve numerous check points and maintenance operations.

Motor Rotation and Phase Tester

F-10 To determine the direction of rotation of electric motors before they are connected to the line and to determine the phase rotation or sequence of energized power circuit, the **James G. Biddle Co.**, 1316 Arch St., Phil-

adelphia 7, Pa. is marketing the Motor Rotation Tester.

Unit saves time in electric motor hook-ups and eliminates guesswork and danger.

Industrial maintenance electricians can dispense with the temporary "hook-up" and permanently connect and tape the terminals of a motor upon installation.

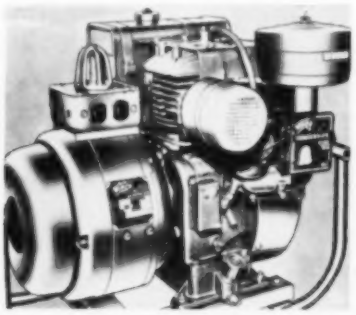
10 lb unit also determines the polarity of power and instrument transformers and can be used as a continuity tester in checking electrical circuits.

Idling Control Featured On Direct Drive Engine Generator

F-11 An idling control that reduces the engine to idling speed with a flick of a lever is one of the features of the new Winco 2500 watt direct drive engine generator being produced by **Wincharger Corporation** of Sioux City, Iowa.

Idling control conserves fuel, extends engine life, and lowers maintenance cost.

The new Winco 2500 watt electric generating plant is designed to give close, steady voltage regulation. Optional equipment includes a 2-wheeled dolly and a retractable starter.



YEARS OF PROTECTION
FROM A SINGLE COAT of Subox

Some of America's greatest utility companies use a single, thrifty coat of Subox* or Subalox* paint to give them many years of anti-corrosive protection.

The life of a Subox paint job averages 5 to 8 years without any chipping, cracking or blistering. Subox paints effectively resist moisture, fumes, most industrial exposures and also abrasive conditions.

You can securely rely on Subox paints to lower your maintenance budgets, for Subox costs no more than any good paint and saves you money over the years.

Write for a copy of "Corrosion Control of Electrical Structures and Equipment."

*Trade Mark

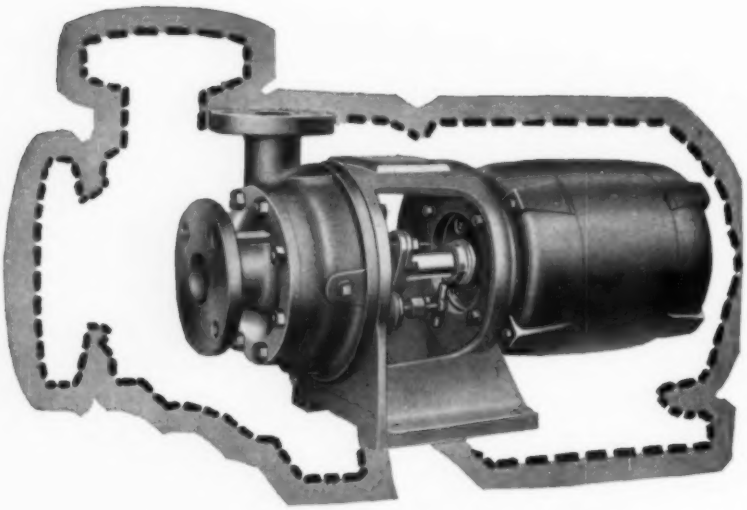
Established 1924 • 6 Fairmont Plant, Hackensack, N. J.

Subox Inc.

The only paint in America made with suboxide of lead, chemically-active rust-inhibitive and anti-corrosive agent.

See Catalogues in Sweet's Industrial and Engineering Files

You can cut pumping costs



by doing the job with a smaller Ingersoll-Rand

MOTOR PUMP

By reducing original cost. Many plant operators say yes, because liquid handling operations can generally be done by I-R Motorpumps of lower horsepower than other pumps.

By saving on weight and space. Both, probably—because Motorpumps are so compact and efficiently designed.

By lowering power consumption. Definitely—many Motorpump users get substantial savings in power over pumps previously used.

By simplifying installation. That's certain—because Motorpumps can be mounted in *any* position . . . on floor, wall or equipment . . . without the need for any special foundations!

You'll find other big I-R advantages in the latest Motorpump catalog. Send for your copy now.

Ingersoll-Rand

9-365 11 Broadway, New York 4, N. Y.

Equipment, Supplies & Methods (Continued)

Insert Rings Simplify Welding of Piping

F-12

Inert - gas tungsten - arc welding of piping without backing rings, smoother root pass welds with elimination of root pass cracking and improved weld contours in thin wall piping with one or two less passes, are some of the benefits offered by a line of new consumable solid insert rings available from the **Industrial Piping Division** of **Grinnell Company, Inc.**, Providence, Rhode Island.

On piping of wall thickness over ¼ inch, the Grinnell welding insert ring assists in obtaining root-pass welds of uniform and smooth contours, free of crater and centerline cracks. The completed root-pass weld provides an effective back-up for the subsequent shielded metal-arc welding with covered electrodes.

On thin-wall piping, as Schedule 5 and 10 stainless steel, the Grinnell welding insert ring improves weld contour.

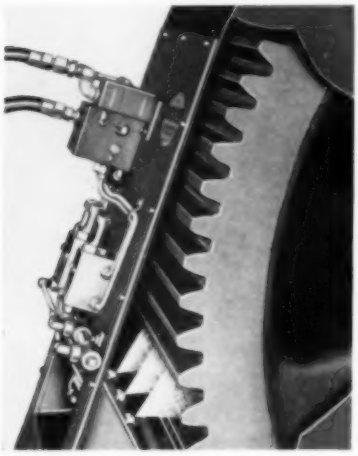
Grinnell consumable solid insert rings are produced for all standard or special pipe and tube sizes of diameters 1½ in. or larger.

Positioning of solid consumable insert ring with positioner pins in pipe joint eccentric to center line of pipe.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

Spray Panel Lubricates Gears

F-13 "Spray Valve Panels," developed by **The Farval Corporation,** 3249 East 80th St., Cleveland, Ohio, are designed to spray-lubricate bull gears and girth gears, of the type found on grinding mills and kilns, and other spur or herringbone gear trains.



The self-contained panels are fastened to gear housings or framework, and spray the lubricant directly to the pressure side of the gear teeth. Measuring approximately 2 ft by 3 ft, the panels feature stainless steel spray valves having built-in nozzles. Central pumping units deliver gear lubricant at regular intervals to a circuit of Dualine measuring valves. The measuring valves distribute the lubricant under pressure to the spray valves where it is mixed with air to form a penetrating spray.

Sealing Oil Leaks

F-14 The Oyltite-Stik for sealing oil leaks under pressure and temperature is being marketed by **Lake Chemical Co.** 3052 W. Carroll Ave., Chicago 12, Ill.

The product has proved satisfactory for use on hot oil pipes where

Boiler Gaskets . . .

. . what's your preference?

Yes, the U. S. Gasket—Belmont Packing line of Boiler Gaskets includes *both* popular types—spiral wound metal-asbestos and wire-inserted woven asbestos—for manholes, handholes and tube caps of all makes of stationary and marine boilers, waterwalls, economizers and other boiler accessories.

So, whatever your preference and operating pressure requirements, ask your U. S. Gasket—Belmont Packing distributor—or write for literature.

United States Gasket Co.
Camden 1, New Jersey
Belmont Packing & Rubber Co.
Butler & Sepviva Sts., Phila. 37, Pa.

U.S. GASKET · BELMONT PACKING

Equipment, Supplies & Methods (Continued)

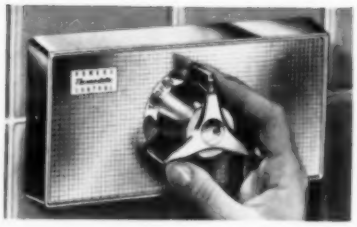
pressures up to 75 psi and temperatures to 400 F are encountered.

Oyltite-Stik seals cracks, pinholes, rusty parts in wilds, etc., in oil tanks, pipes and containers of all kinds. It is furnished in handy stick form and simply rubbed across the leaky area. It can be applied while oil is flowing; there is no need to drain tanks or pipes.

Thermostatic Control For Industrial Plant Shower

F-15 A new simplified shower control — the Type H Hydroguard — has been introduced by **Powers Regulator Co.**, 3400 Oakton St., Skokie, Ill. There is only one dial to turn and there is only one hole in the tile wall, instead of the usual 2 to 4 for various valves. Simplified installation reduces cost and improves appearance.

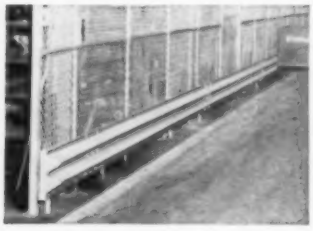
The thermostatic mixer employed by the Hydroguard safeguards



against both pressure and temperature changes in water lines. Failure of either cold or hot water supply instantly shuts off the shower. Triple duty strainer-check-stop fittings are concealed beneath the cover of the control and are easily accessible by removing the dial.

FLEX-BEAM GUARDRAIL IMPROVES PLANT SAFETY

Armco Guardrail protects employees and plant property at low cost



Inside this plant, Armco FLEX-BEAM Guardrail protects the tool crib from damage by passing intra-plant trucks.

In this company parking lot, Armco FLEX-BEAM Guardrail defines parking areas while conserving space.

Armco FLEX-BEAM Guardrail is a deeply corrugated, beam-type, all-steel guard. It promotes safety, protects employees and plant property.

INSIDE PLANTS Here, FLEX-BEAM protects vital and costly equipment from damage by in-plant trucks and dollies. Along walkways this sturdy guardrail prevents encroaching vehicles from injuring employees.

IN PARKING LOTS Armco FLEX-BEAM defines parking areas and makes room for more autos. And orderly parking reduces chances for damaging bumps and scrapes.

Sections of Armco FLEX-BEAM Guardrail are simply bolted together and attached to posts or building structural members. Installation costs are low. Write us for more data.

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ARMCO®

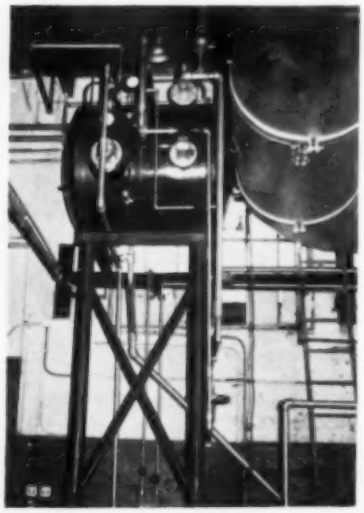
Compact Deaerating Heater

F-16 Designed for use in small plant where economy and space requirements are of prime importance, **Graver Water Conditioning Co.**, 216 West 14th Street, New York, New York, has developed the SSC Deaerating Heater.

It is a two-stage, spray type heater containing an internal vent condenser of stainless steel. It reduces corrosion of feed-water lines, boiler tubes and condensate return lines; recovers heat and improves thermal efficiency; and provides maximum storage of condensate surge.

The heater is easily installed and comes completely equipped with all accessories in a wide variety of sizes. Bulletin WC-118 gives complete description.

Graver SSC Deaerating Heater mounted above operating floor in a milk processing plant. Mountings need not be as high. A lower head pump requirement can reduce the height.



Pressure Oiling System For Bearing Points

F-17 "Lub - O - Jet," made by **Trico Fuse Mfg. Co.**, 2948 N. 5th St., Milwaukee 12, Wisconsin, is a centrally located, easily accessible, self-contained oiling system that delivers oil, under pressure, to various points of all types of equipment such as line shafts, gears, chains, cams, gibs, round or flat stock, felt pads, etc.

Applicable to such hard-to-get-at places as fractional horsepower motor bearing on fans, blowers, unit heaters, etc.

A pressure pump is built into the 4 oz shatterproof reservoir. Oil supply is always visible.

Air Flow Measurement

F-18 A highly accurate instrument for measuring minute air flow movements is being marketed by **Hastings Instrument Company, Inc.**, Hampton, Virginia, for use in connection with smog, air pollution and similar studies.

The Hastings Model R Air-Meter assures excellent readability below

TO GUARD YOUR WORKERS AGAINST SKIN AILMENTS

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Powered with ACTAMER* for Dermatitis Control

For easy filling of dispensers VI-LAN CLEAN is provided in polyethylene bags, thru which you may squeeze all or as much as is needed into the dispensers without waste.

Also available is a portable self-service unit, No. 815, equipped with 2 dispensers, 2 Scott industrial wiper brackets, plus a large waste disposal bin of large capacity.

For your convenience, VI-LAN CLEAN also is shipped in pint and quart can containers. Write NOW for descriptive folder and sample.

VI-LAN CLEAN is a degerming cleanser guarding your employees hands and bodies against irritation and infection.

VI-LAN CLEAN is fortified with ACTAMER*, evolved by the Monsanto Chemical Company. It is a potent bacteriostat that reduces resident skin bacteria by as much as 97%.

This emulsion paste cream does what soap and detergents can not do. Non-alkaline and acid free, and whether used "with or without water," it will not in any way effect the insulation value of rubber gloves. It controls dermatitis, and is a preventive of poison ivy and creosote burns.

VI-LAN CLEAN cleanses while it guards hands, face and body against skin contaminations; it removes greases, oils, paints, acids, expoxy resins, glues, printing inks, asphalt, thinners, crater compounds, rubber and gasket cements. It is non-irritating. It contains lanolin to restore natural skin qualities.

For safety's sake, for cleanliness, to prevent skin ailments and lost man hours, absenteeism and expensive compensation claims, give your employees the benefits of VI-LAN CLEAN.

Place VI-LAN CLEAN dispensers on your trucks and other service units, and the larger self-service units in all wash rooms and in critical on-the-job locations, to economize and to speed up your employees wash-ups. There is nothing like it anywhere.

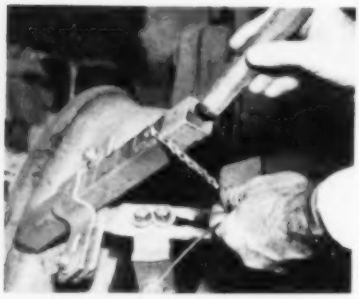
DAMERON enterprises, inc.
427 So. 20th Street
Louisville 3, Kentucky

5 mph and unusual accuracy below 1 mph. Range is 0-30 mph. Response time is less than one second.

Price is approximately $135.00. Catalog No. 139 describes the instrument.

Wheel Maintenance on Rolling Stock Equipment

F-19 For plants which have a need for a flange or rail lubricant, **Transall, Incorporated,** Box 1588, Birmingham 3, Ala., is marketing their flange lubricator and lubricating sticks.



The dry lubricant is adapatable to many uses where friction is involved — underground mine locomotives, rotary kilns, overhead cranes, or any kind of rolling stock equipment. It will not creep to the tread and cause slippage.

Standard lubricating stick is 15/16" square x 6" long, but can be produced in any size. Stick life varies with operating conditions.

The Transall Lubricator has no moving parts and can be mounted in any suitable location that moves with the lateral and vertical motion of the wheels. Reduces hot spots, cutting, pitting, and peeling of the flanges to a minimum. Prolongs life of rails, etc.

Pre-Cast Insulated Stack For Industrial Incinerators

F-20 **Van-Packer Corp.,** Bettendorf, Iowa has introduced the pre-cast insulated stack for low-cost of venting of industrial incinerators.

The cost of the Van-Packer stack

is said to be about 2/3 less than a comparable brick stack and about the same as a steel stack. Manufacturers state that an incinerator installation does not warrant the cost of a brick stack, yet demands the permanence and high draft of masonry construction.

Vermiculite concrete chimney sections of the stack are not affected by corrosive food gases and can withstand the sudden and frequent temperature shocks developed by incinerators. Stack is made up of 3-foot long sections cemented one on top of the other with acid-proof, high temperature joint cement. Each section has an aluminum outer jacket which eliminates maintenance and painting. Available in six sizes from 10" I. D. to 24" I. D. and can be installed inside or outside.

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Pages 17-18

Books for the Plant Engineer

Servomechanisms and Regulating System Design

By Harold Chestnut and Robert W. Mayer
Published by John Wiley & Sons, Inc.
440 Fourth Ave., New York 16, N. Y.
384 pages
Price, $8.50

Volume II builds on fundamentals stated in Volume I. It states the problems met in design of regulators and feedback control systems and develops methods for their solution.

Subjects covered are measurement of quantities, means of establishing design specifications; techniques for handling effects of extraneous signal inputs; factors influencing selection of elements for power and stabilizing sections; amplifier design factors to minimize gain changes, drift, and changes in tubes and their components; all a-c servomechanism; linearization techniques and non-linear operation for large input signals and deliberate parameter changes; and many illustrative problems are included.

Atomic Energy Research at Harwell

By **K. E. B. Jay:** Published by **Philosophical Library, Inc.,** 15 E. 40th St., New York 16, N. Y.; 144 pages; Price $4.75

This very interesting volume gives an authoritative review of the scientific work done at the British Atomic Energy Research Establishment at Harwell, England, during the eight years of the Establishment's existence. An earlier edition was published in 1952 and the present volume places emphasis on information declassified in the interim. The volume is divided into two parts. Part I deals with major programs of the Establishment and is written chiefly for non-technical readers. Part II deals, in considerable detail, with selected research investigations and is intended for readers who have a scientific background but who are not specialists in the fields discussed.

The volume includes a very useful glossary of nuclear energy terms which should be of particular interest to the uninitiated. The diverse peaceful applications of nuclear energy discussed in the book make useful and absorbing reading for engineers.

Magnetic Materials in the Electrical Industry

By **P. R. Bardell:** Published by **Philosophical Library, Inc.,** 15 E. 40th St., New York 16, N. Y.; 288 pages; Price $10.00

This volume should be welcomed by those engaged in research or manufacture in any of the many industries concerned with magnetism and magnetic materials.

It provides first hand knowledge of the production, measurement and application of certain classes of magnetic materials which has been applied and extended to assessing critically the whole available range in explicit relation to their applications.

This treatment brings out clearly that the full realization of the high magnetic qualities of the modern materials is closely interrelated with the design of systems in which they are to be utilized.

This analysis is not only of value to the user of magnetic material, but it constitutes a treatment of applied ferromagnetism excellently adapted to the teaching of the subject.

Gas Turbines and Jet Propulsion

By **G. Geoffrey Smith:** Published by **Philosophical Library, Inc.,** 15 E. 40th St., New York 16, N. Y.; 412 pages; Price $15.00

This book is the sixth edition of a pioneer book on Gas Turbines and Jet Propulsion by G. Geoffrey Smith who wrote the original edition as series of articles in the British journal *Flight* in 1941. The present edition was undertaken by F. C. Sheffield after the death of Geoffrey Smith. Mr. Sheffield has done a creditable job in presenting a veritable storehouse of technical information on British, European and American jet units. Chapters are devoted to applications of the gas turbines in fields other than jet propulsion.

This volume must be regarded as a source book of technical details of gas-turbine installations and as such it is without peer. It is not a theoretical work and very few formulas or equations are to be found in the book. It is an excellent example of technical exposition at its best and is a worthy addition to the library of anyone interested in this field.

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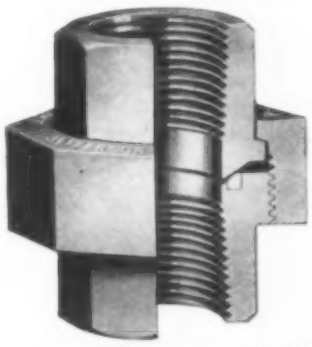

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Jefferson
A-4 PIPE UNIONS

To follow the lead of user experience is a safe, simple "rule of thumb" to apply in selecting pipe unions as well as any other kind of mechanical equipment. In the case of Jefferson, with its many years of specialization in design and manufacture, there is remarkable consistency in the way such characteristics as low installation and maintenance costs come in from users.

In some respects these reports should not be termed "remarkable," because, after all, Jefferson Unions are designed and made with the maximum in economy and performance constantly in mind. User experience in the field can be traced, therefore, to the materials used in construction and the features of design which are exclusively "JEFFERSON":

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NEW CATALOGS for the Man-in-the-Plant

FOR FREE INFORMATION — Circle code number on page 17 or 18

R-1 Relay Maintenance

Folder "The Why and How of Protective Relay Maintenance" describes the general types of test equipment commercially available, auxiliary instruments required for trip-time calibration, the standard means for conducting these tests and the normal routine to follow. A comparison table lists the characteristic advantages of the various techniques in current application with respect to safety, ease of handling, accuracy and versatility. —MULTI-AMP CORPORATION, Newark, N. J.

R-2 Sectional Condenser

4 page Bulletin No. 131 shows benefits of new, sectional-design refrigeration condensers for 100 to 240 tons refrigeration capacity and explains their functions with diagrams and installation photographs.—NIAGARA BLOWER COMPANY, 405 Lexington Ave., New York 17, N. Y.

R-3 Welding Data Book

140 page Data Book TIS 2575 features simplified welding procedures for every base metal. This guide to improved torch and metallic arc welding, brazing and soldering gives useful "how-to-weld" information for fabrication, maintenance repair and salvage, overlaying for wear and corrosion resistance and welding of dirty, rusted parts. Special welding applications—joints with high electrical conductivity, resistance to chemicals, tinning and plating — are covered, along with methods of gouging, chamfering and removing of unwanted metal without special equipment.—EUTECTIC WELDING ALLOYS CORP., 40-40 172nd Street, Flushing 58, N. Y.

R-4 Axial Fans

36 page Bulletin B-1013 describes Series 203 axial fans for ventilation, process air supply and process air recirculation applications. 8 pages of selection tables and 3 pages of installation type drawings giving detailed dimensions for the full range of direct drive tubeaxial, direct drive vaneaxial and V-belt drive vaneaxial fan sizes. — AMERICAN BLOWER CORPORATION, Detroit 32, Michigan.

R-5 Insulations & Refractories

20 page catalog "Johns-Manville Insulations" provides information on the composition, physical and thermal properties and sizes of various products. Covers materials for the efficient control of temperatures from 400 F below zero to 3,000 F above. Insulations covered: blocks & sheets, pipe insulation, insulating cements & fills, insulation weather-protection — coatings, insulating fire brick, insulating brick, hydraulic-setting refractories, and aggregates, fills and boiler coating. — JOHNS-MANVILLE, 22 East 40th Street, New York 16, N. Y.

R-6 Plate Coils

Bulletin No. 256 gives price and technical data on a plate coil heat exchange surface that takes the place of pipe coils in industrial heating and cooling processes. Consisting of two plates having suitable embossings and welded together to form the necessary flow channels, Thermo-Panel Plate Coil is available for many kinds of applications, is made of various metals in such sizes, shapes and assemblies as would best fit an individual condition. — THERMO-PANEL DIVISION, Dean Products, Inc., 616 Franklin Ave., Brooklyn 38, N. Y.

R-7 Sling Loads

Bulletin 5308 lists the safe loads for slings of twenty sizes wire rope when used at various angles of application. Covers slings varying from ½ ton safe load to 48.7 tons safe load.—MACWHYTE COMPANY, Sling Department, Kenosha, Wisconsin.

R-8 Wrought-Iron Fittings & Flanges

Folder describing Tube-Turn wrought iron welding fittings and flanges give dimensional data in sizes ranging from ½" through 12", discusses the physical properties of the material, and illustrates typical applications.—TUBE TURNS, 224 East Broadway, Louisville 1, Ky.

R-9 Cemented Oxide

Bulletin GTO-103 gives latest information for applying cemented oxide tool materials, covering Carboloy's initial grade 0-30. It describes tool holders required, metals machined to date and tooling information such as cutting angles, chip control, cutting speeds and feeds, coolants and regrinding. Data is also included on several test applications, along with the results.—CARBOLOY, Department of General Electric Company, Detroit 32, Michigan.

R-10 Wire Rope

24 page Bulletin No. DH-128D "Wire Rope Recommendations for Industrial Services" covers more than 120 different types of wire ropes used in construction, conveyors, cranes, dredges, railroads, steel mill and blast furnaces. Rope diameters, construction, preforming, lay, grade and core are covered in each recommendation.—AMERICAN CABLE DIVISION, American Chain & Cable Co., Inc., Wilkes-Barre, Pa.

R-11 Noise Control

Bulletin A-140 describes doorless telephone booth which excludes outside noise interfering with conversations and fur-

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nishes privacy and comfort. It can be used in extremely noisy locations where errors in receiving phone calls can be most serious and costly. — BURGESS-MANNING CO., Architectural Products Div., 5970 Northwest Highway, Chicago, Ill.

R-12 Air Conditioners

Bulletins No. C-1100-S106P (Vertical model), No. C-1100-S107P (Vertical and Horizontal model), and No. C-1100-S108P (Horizontal model) give complete dimensions and operating data on new line of central station cabinet type air conditioning units. Outstanding features: complete flexibility and compactness which can solve almost any space problem, and interchangeable panels which permit any preferred air discharge and intake. — WORTHINGTON CORP., Harrison, N. J.

R-13 Multiple V-Belt Drive

36 page booklet covers the evolution of standards in engineering V-belt drives, tells how to engineer a V-belt drive, provides tables and data, describes modifications in V-belt drives, and answers a number of questions relating to some of the basic principles and practices involved in the engineering and use of multiple V-belt drives. — ALLIS-CHALMERS MANUFACTURING COMPANY, 945 S. 70th Street, Milwaukee, Wisc.

R-14 Roller Bearings

72 page catalog contains specifications and data on all models of Shafer Self-Aligning roller bearing units, shaft sizes ranging from ¾" to 7". Describes the Shafer Self-Aligning principle of concave rollers running between convex raceway, Shafer Micro-Lock Adjustment, Shafer "Z" Seal, etc. Also includes completely revised engineering data, new load rating tables, exploded view for parts identification, etc. — CHAIN BELT COMPANY, Milwaukee 1, Wis.

R-15 Electrical Connector

Catalog describes the Arc Proof Line Connector, the design of which permits adequate pressure to be applied for an electrical connection without flattening or deforming the conductor. Arcing is prevented by a coil spring which maintains contact on the main conductor even when the bolt is loosened three full turns. Clamps can be installed with hot line sticks. Conduit sizes range from ½" to 6". Prices and shipping data are also included.—THE LAMB CORPORATION, Room 515, Peoples Bank Building, Tyler, Texas.

R-16 In-Plant Photography

16 page booklet "Industry Cuts Costs With 'In-Plant' Photography" describes economies achieved in aircraft, metal, machine, heavy equipment, and other industries through the use of company-sponsored photography. Cites successful applications of photography to solve sales, employee relation, manufacturing, engineering, and design problems of both large and small companies. — GRAFLEX, INC., Rochester, N. Y.

R-17 Low Voltage Switchgear

Bulletin 6004B describes metal-enclosed, drawout indoor and outdoor Type K and Type LG air circuit breakers. Ratings: through 6,000 amperes continuous; 15,000 through 150,000 amperes interrupting; 240 through 600 volts AC — 250 volts DC. — I-T-E CIRCUIT BREAKER COMPANY, Switchgear Division, Philadelphia, Pa.

R-18 Blow-Off System

Bulletin No. 152 describes the rotary disc continuous blow-off unit. It gives economy in fuel and water savings, quick return on investment, uniform concentrations in boiler water, accurate, dependable control of boiler blow-off, wide range of blow-off with 15 orifices, free maintenance —no moving parts to wear out, and cleaner boiler. Wet steam and carry-over is eliminated, sediment chamber and screen assembly protect orifices from plugging and flow chart indicates rate of flow through each orifice.—THE UNIBLOW VALVE COMPANY, 1920 West 77th St., Cleveland 2, Ohio.

R-19 Mercury Vapor Lamps

Booklet "Better Industrial Lighting with Mercury Vapor" contains 8 basic advantages of using mercury vapor lamps in industrial plants, shows 10 typical application examples, gives engineering hints for effective installations, discusses proper use of high bay reflectors, tells various ways to meet color requirements, and gives information on how to combine mercury vapor lamps with fluorescent or incandescent lighting.—SYLVANIA ELECTRIC PRODUCTS INC., 1740 Broadway, New York 19, N. Y.

R-20 Filter Underdrains & Tile

8 page Bulletin 901 explains the advantages of Wagner Filter Underdrains in providing every requirement for perfect wash water distribution, assuring proper and efficient filter backwash. Easily incorporated in designs of filter beds of practically all sizes and arrangements.—INFILCO INC., Tucson, Arizona.

R-21 High Capacity Filter

4 page catalog MK-170 describes the high capacity, simplified filter for diesel fuel and lube, pipelines, process liquids, water, gasoline and aviation fuel, which is designed for flow rates up to 2000 gpm in a small space (2½' x 4½') and offers four degrees of filtration (50, 25, 10 and 5 microns) down to 1 micron.—THE CUNO ENGINEERING CORP., Meriden, Conn.

R-24 Feedwater Controller

4 page Bulletin 5623 suggests a practical solution to out-of-bounds initial, operating and maintenance cost of boiler water level control. Feed Valve modulates feedwater flow within plus or minus ¼" of desired water level, provides installation liberties, location of controls to best physical and economical advantage, operates on pressure alone, offers positive, automatic compensating service, without the clamor of high and low water alarms, even during steam load swings.—THE C. E. SQUIRES COMPANY, 18502 Syracuse Ave., Cleveland 10, Ohio.

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Condensate Line Corrosion

(*Continued from page 49*)

entire solution to the problem, it was a good start.

The principle reason for this temperature cycling was an installation error of throttling the size of the steam piping to the deaerator to 1" instead of the specified $2\frac{1}{2}$". Location of make-up discharge into the heater, proper venting and sometimes temperature control must all be considered.

Last on the correction list for this plant was installation of a continuous blowdown to control concentration of solids and controlled feed of proper chemicals to scavenge oxygen, to combat CO_2 in the condensate and to maintain alkalinity and precipitation of sludge. It appears that any carry-over of dissolved solids would have a direct bearing on the conductivity of condensate and its properties of promoting electro-chemical corrosion. Thus, the recommendation for the continuous blowdown.

Case History No. 2

A 600 psig steam plant supplied several turbo-generator units with superheated steam. The turbines operated condensing and supplied extraction steam at 125 psig for processing and heating for a mechanical shop about 2,000 ft away. The basic flow diagram is shown by Figure 3.

The installation was quite new, temperature and pressure readings for all important equipment were logged every hour and control tests of feedwater, boiler water and condensate were made every shift. Chemical treatment of the boiler water and deaeration were under careful control, yet something was causing serious corrosion in the condensate piping. High turbidity first led to this suspicion, later verified by analysis of iron in the condensate.

Electro-chemical measurements and pH readings were taken hourly over a period of several weeks. Of much interest was the fact that the peaks of both readings coincided and that they occurred at night and during week-ends.

Investigation showed that the float controlled, condensate return pump would operate once every five minutes during week-day load at the mechanical shop, but during nights and week-ends, the pump would operate but once every thirty or forty minutes. These periods of stagnation in the condensate piping appeared to cause build-up of a deposit on the internal surfaces of the piping, perhaps an oxide or ferric-chloride. Then when the pump started, the deposits would go into solution and greatly increase the conductivity. It is believed that the corrosion rate followed a similar pattern.

The most surprising part of this problem was the simplicity of its solution. It merely involved adjustment of the stops on the rod to the float switch control for condensate return so that the pump would operate much more frequently during low, process load periods. Subsequent data showed that the peaks of high pH and high flow of electrical current flattened out, the iron content of the condensate returns was greatly reduced and it appears reasonable to assume that the troubles were greatly reduced.

Conclusions

While this article stresses importance of electro-chemical relationship to many corrosion problems, it is proper to state that this is not a new concept.

Close control of boiler water treatment to prevent any contamination of steam and its condensate is a must, to prevent this waste. Then comes **selection of metals:** there is evidence that wrought iron for condensate piping has an important place in solution of this problem.

Last, but not least, the problem of condensate line corrosion involves so many variables, a complete **survey by a qualified engineer** is advisable for firming up a planned solution. The study of each installation should consider the possible correlation among approaches of chemistry, electro-chemistry, metallography and general mechanical engineering.

Industry Speaks

(*Continued from page* 41)

er companies, engineering firms and construction organizations are represented among these groups. Hardly five years have elapsed since industry has been permitted to search for ways to apply nuclear energy to civilian use, but much progress has been made.

The managements of the electric utility companies making up the Southern Company system, realizing that future generating capacity will inevitably become more and more dependent upon thermal plants, undertook to investigate means of participating in studies of the possible application of nuclear energy to their future power requirements.

Savings

It was soon recognized that many man-hours of specially trained personnel and vast sums of money would be required in the study, research and development work necessary before an economically feasible reactor could be built. To make the greatest progress it was decided in 1953 to accept an invitation to join the Dow Chemical - Detroit Edison study group which had selected the fast neutron breeder reactor for extensive study. This type of reactor produces more nuclear fuel than it consumes.

Through reorganization this group is now known as Atomic Power Development Associates, Inc. (APDA), and includes 32 electric power systems and 11 other industries, five of which are engineering and construction firms.

Through 1955, more than 7 million dollars has been spent by the group in research and development of the breeder reactor. This is a fine example of a well-coordinated research and development project where the greatest results are achieved at minimum cost through the most efficient utilization of available talent. Duplication of effort is eliminated, high grade talent is utilized on a full time basis, and results are made available to all member companies on an equal basis.

Thus the four operating utilities in Georgia, Alabama, Florida and Mississippi, comprising the Southern Company system, are enjoying the results of the efforts of a 70-man research organization — results which could not possibly be achieved had our system companies undertaken the program alone.

All Companies Active

Today, every major investor-owned utility in the Southeast has obtained an access permit, has obtained the necessary security clearance for a limited number of employees, has established committees and is providing security-approved repositories for handling and storage of classified information. This is a big step forward in our Southern progress and it was taken as promptly as legislative provisions permitted.

Florida Power & Light Company, Florida Power Corporation and Tampa Electric Company have joined with Stone & Webster, Babcock & Wilcox, and Allis-Chalmers to undertake studies of the economic feasibility of constructing a large-scale nuclear power plant in Florida for electric utility service. These companies have formed committees to study the cost elements involved and to review experimental data and designs of reactors.

Joint Committee

A joint committee has been established in the Virginia-Carolina area to study available information on power reactors with a view to undertaking a program when it has been determined to be economically feasible.

AEC, in January, 1955, established its Power Demonstration Reactor Program. In furtherance of this program, Detroit Edison Company and twenty-five other companies, many of which are members of APDA, have formed a non-profit corporation known as Power Reactor Development Company (PRDC) for the purpose of constructing a developmental fast neutron breeder power reactor based upon conceptual designs by APDA. This reactor plant, having

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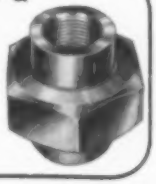

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Seven Years Hence

Certainly it can be said that nuclear power potentialities have not been overlooked by the electric utilities in the Southeast. On the contrary, they regard this as the most promising development in the history of their industry and they are sparing no efforts to bring about the prompt realization of that promise.

I have no hesitancy in predicting that seven years hence the installation of a nuclear power station on the system of Georgia Power Company will be receiving very serious consideration by those who are responsible for the planning of additional generating facilities for the Southern Company system. Such an installation may be deserving of economical and engineering consideration ahead of that time, perhaps within five years.

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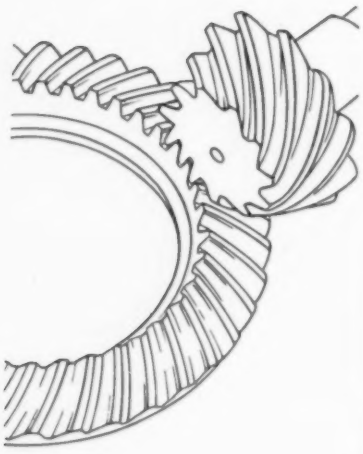

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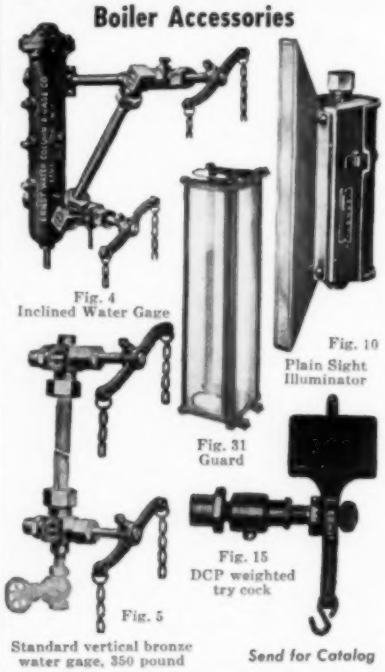

Fig. 4 Inclined Water Gage

Fig. 10 Plain Sight Illuminator

Fig. 31 Guard

Fig. 15 DCP weighted try cock

Fig. 5 Standard vertical bronze water gage, 350 pound

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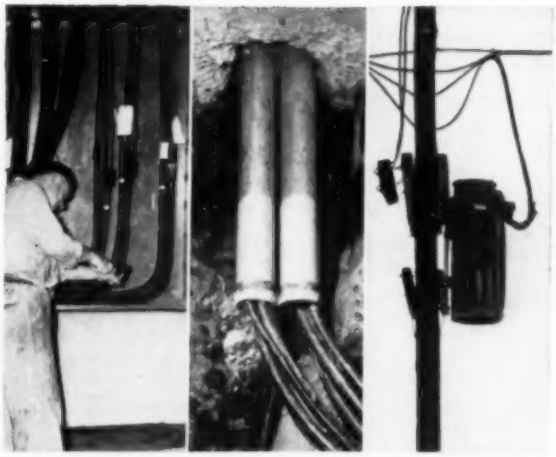

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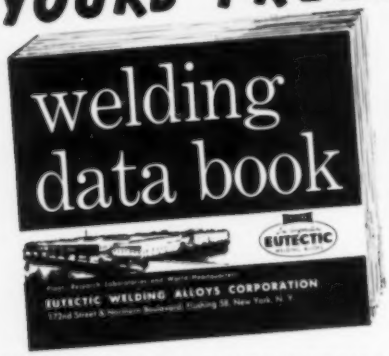

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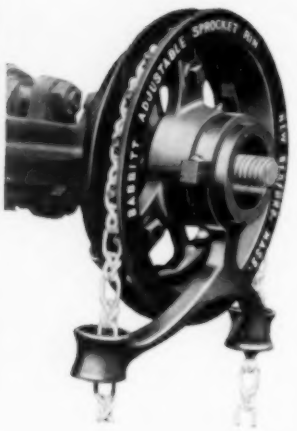

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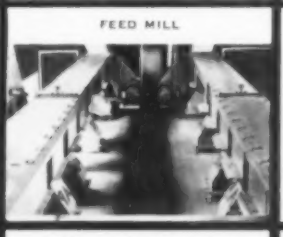
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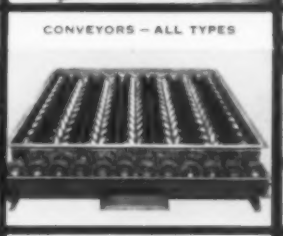
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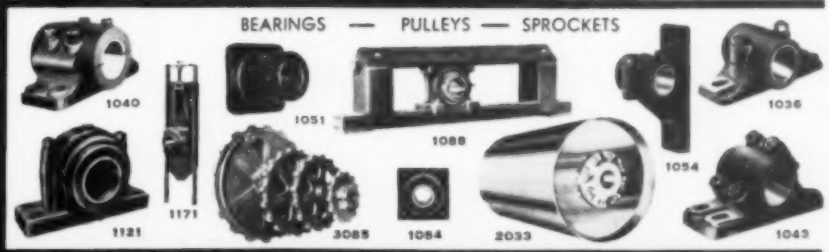

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